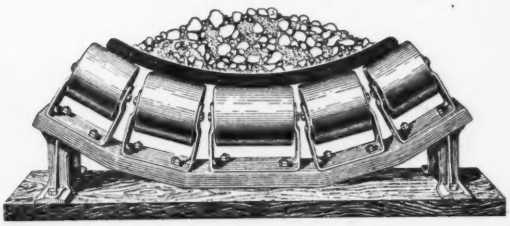
Pit and Quarry
GRAVEL · STONE
HANDLING · CRUSHING · SCREENING · WASHING

The Tire vs. The Road
The Belt vs. The Load



The Principle Is the Same

The tread of a tire must protect the carcass from the abrasion of the road. In like manner the cover of a conveyor belt must protect the body of the belt from the punishment of the load.

A conveyor belt best performs its task when its cover is constructed especially to meet the conditions encountered in the particular installation for which the belt is intended.

In every United States Rubber Company conveyor belt the kind and thickness of cover, as well as every other feature of the belt's construction, is determined by the work it must perform. The longest possible service is therefore assured.

United States Rubber Company

FEBRUARY, 1920

Index to Advertisers - - - Page 47
Power Plants Section - - - Page 133

For All Belt Conveyors

S-A Unit Carriers

win the everlasting confidence of users.

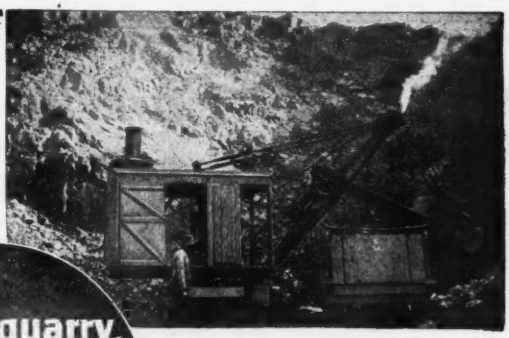
They save power
They save lubrication
They save belt wear
They save worry

S-A Belt Conveyors

Equipped with UNIT CARRIERS Are Dependable.

S-A MFG. CO. 5150

STEPHENS-ADAMSON MFG. CO. AURORA ILL.



ERIE Shovel owned by White Oak Crushed Stone Co., New Britain, Conn.

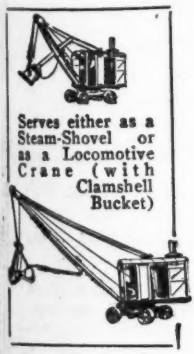
In this quarry, the ERIE saves $70 a day

"The ERIE Shovel replaces 25 men in this quarry," *says B. J. Bixby Supt., WHITE OAK CRUSHED STONE CO., New Britain, Conn.*, "It saves more than $70 a day, after deducting all shovel expenses, including depreciation and interest.

"We have a hard trap rock in this quarry, and we need the compact and durable build of the ERIE."

The ERIE is the *RELIABLE* steam shovel. It is built with enough strength to work steadily, even when loading hard rock.

We would like to send you a Bulletin showing just what the ERIE Shovel can do. Write for a copy of Bulletin Q. Address:



Serves either as a Steam-Shovel or as a Locomotive Crane (with Clamshell Bucket)

BALL ENGINE CO., Erie, Pa.
Builders of ERIE Steam Shovels and Locomotive Cranes.

ERIE Revolving Shovels BALL Engine Co. Erie, Pa.

If You Can Reduce Your Drill Upkeep Costs From 14c to 5c per 8-Hour Run—

You want to accomplish this very desirable saving, of course. That's the record on an 8 months' test of

Hardsocg Wonder Drills

Observe These Advantages:

This drill can be operated either by compressed air or steam.

The use of live air or steam for operating the drill or cleaning drill hole of cuttings is controlled by one lever handle valve.

When in operation the piston hammer will not strike front end—thus eliminating breakages.

The lowest consumer of air of any drill made doing same amount of work. Fifty feet at 80 pounds pressure operates this drill successfully. Can you operate any other drill as economically?

Fewest number of parts, and lowest cost of upkeep.

Skilled labor not necessary with this drill.

Write for Descriptive Bulletin

Hardsocg Wonder Drill Company

Ottumwa, Iowa

Little Giant Road Crane

The Most Efficient Means of Handling Your Product

In your scope of operations, the labor-saving possibilities of a LITTLE GIANT ROAD CRANE are unlimited. You can, with a LITTLE GIANT ROAD CRANE, effectively handle more material with a distinct saving in labor. Consequently, you cannot afford to ignore the opportunities presented by a LITTLE GIANT ROAD CRANE.

We are willing to supply you all the details and show you how a LITTLE GIANT ROAD CRANE will make money for you.

Address Department "C"

The Locomotive Crane Company OF AMERICA

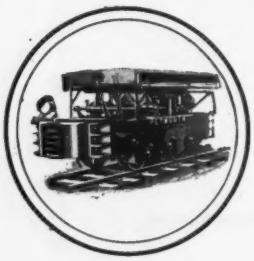
CHICAGO · ILLINOIS

Sales Representatives: Brandeis Machinery & Supply Co., 325 W. Main St., Louisville, Ky. E. H. Edwards & Company, 37 W. Van Buren St., Chicago, Ill. Wm. H. Hale & Company, 609 Fifth Ave., So., Minneapolis, Minn. J. A. Heineman, 140 S. Dearborn St., Chicago, Ill. C. E. Kimball, 214 Curry Block, Winnipeg, Manitoba. M. H. Brown, 203 Iowa Bldg., Des Moines, Iowa. Chas. T. Lehman, 2300 Avenue A, Birmingham, Ala. T. H. Letson Company, 50 Church St., New York, N. Y. K. W. Lewis, Commerce Trust Bldg., Kansas City, Mo. James A. Lindsley, Sacramento, Cal. Chester A. Phillips & Co., 970 Old Colony Bldg., Chicago, Ill. F. C. Rabbiett, Railway Exchange Bldg., St. Louis, Mo. Herbert Toogood Machinery Co., 1731 Wazee St., Denver, Colo. Videtto-Ruane Machinery Co., Bessemer Bldg., Pittsburgh, Pa. John Hyland, 1209, 4th Natl. Bank Bldg., Atlanta, Ga. R. B. Houghton, 906 Oliver St., Boston, Mass.

PLYMOUTH
Gasoline Locomotives

"A Great Help to Industry"

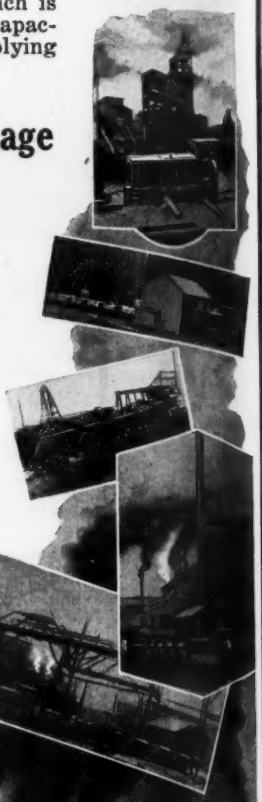
says the management of the Illinois Zinc Company—"They save time, accomplish more work, and at far less cost per ton." They are a permanent unit of this great Industry which is at present stretching its capacity to the utmost in supplying Zinc to the world.



"Plymouth" Haulage

In the Mines, on the Surface and Elevated—is an investment that results in "More Tonnage At Half The Cost." Sturdy built to stand every-day service. Easily operated. Low cost of upkeep.

The Plymouth is now used all over the world, and all users recommend it as a good investment.



What Is Your Haulage Problem?

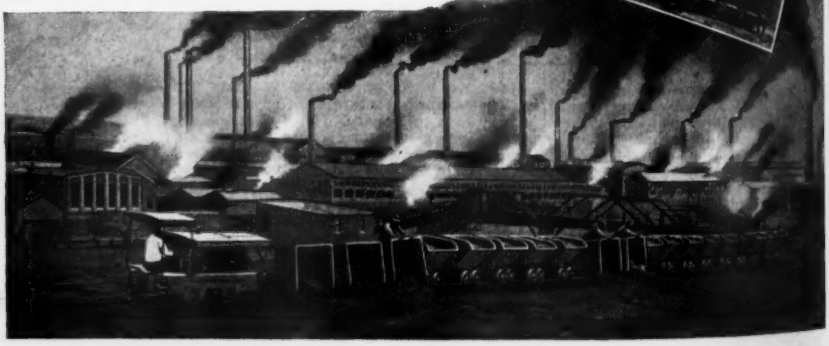
Write us about your present haulage system and let our engineers determine the fitness of the Plymouth. We are glad to consult with you.

Get the Facts—Ask for illustrated catalog showing the many phases of "Plymouth" Haulage—What it is doing for others it will do for you.

The Fate-Root-Heath Co.

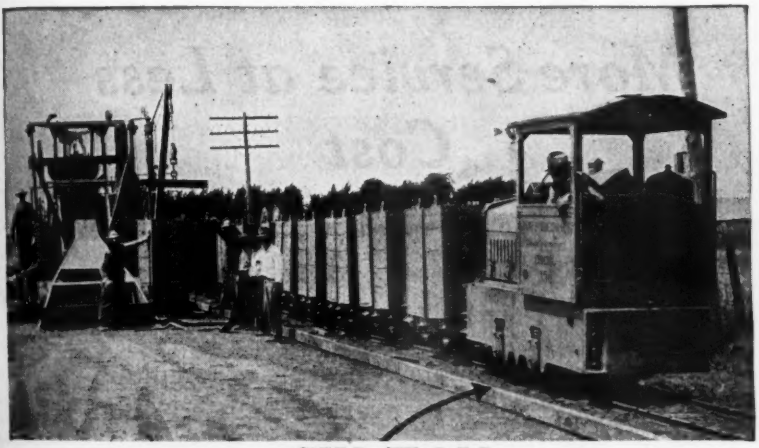
206 Riggs Ave. Plymouth, Ohio

Representatives in All Principal Cities of America



WHITCOMB LOCOMOTIVES

ALL SIZES
FOR ALL CONDITIONS
POSITIVE GEAR AND FRICTION DRIVE
GASOLINE AND STORAGE BATTERY



SIX TON

3-Speed Positive Drive

Road Contractors Special

This Six-Ton Gasoline Locomotive Will High Ball More Material to the Mixer Than Any Other Gasoline Locomotive Built of Its Weight.

Gasoline Locomotives, 2½ to 25 Tons. Storage Battery Locomotives, 2 to 8 Tons on Drivewheels.

GEO. D. WHITCOMB CO.

ROCHELLE ILLINOIS

More Service at Less Cost

"SHAYS" attain speed in 22% less time than a rod engine.

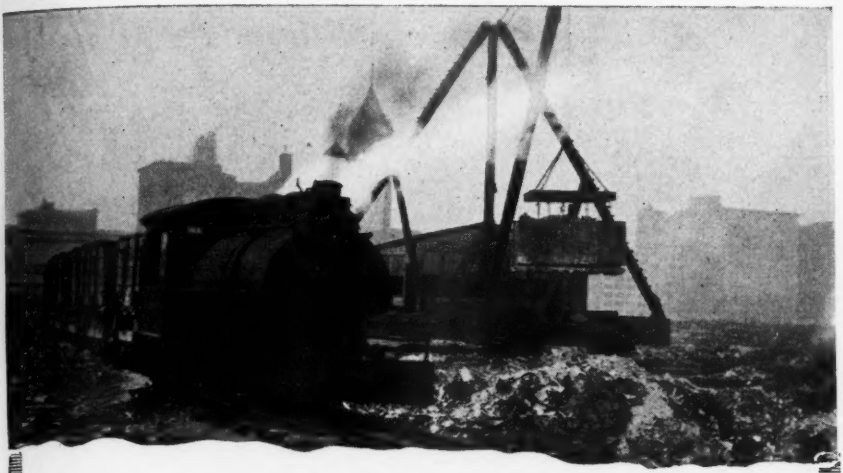
They spot cars 11% quicker.

They are easier and cheaper to maintain than a rod engine—every part is a "one-man" part that can be easily adjusted by one man without special tools.

We build both rod engines and "SHAYS" yet we always recommend "SHAYS" for quarry service.

We know they will give more service at less cost.

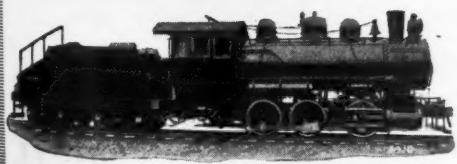
Lima Locomotive Works, Incorporated
LIMA, OHIO
New York Office, 30 Church St.



Five winters of contracting work without a breakdown—even in the coldest weather.

The record sheets on this VULCAN Locomotive show that it hauled 2,000,000 cubic yards of dirt in two and one-half years, or slightly more than 2,400 cubic yards per day with an average of 32 trains and a total daily run of nearly sixty miles.

A typical VULCAN record



Vulcan Iron Works

Locomotive Designers and Builders for 48 Years

1754 Main St.

Wilkes-Barre, Pa.

"Very Satisfactory"

is what Holbrook & Skinner say of

The BAY CITY LOADER

For Pit and Quarry Service

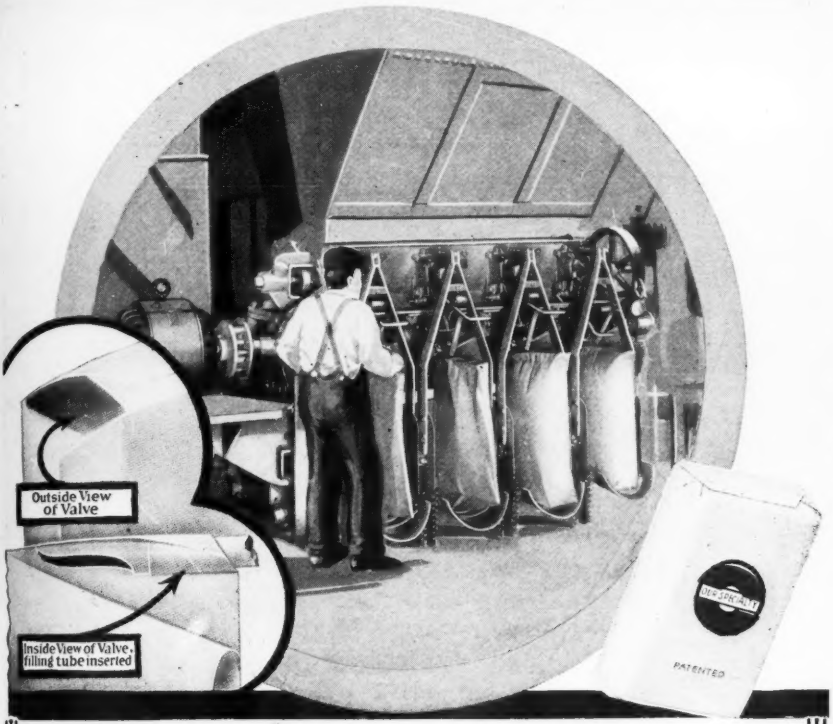
This machine is in operation loading gravel at their plant in Lansing, Mich. It is rendering excellent service and Mr. Skinner most willingly said so.

The BAY CITY Loader operates a powerful digging bucket that takes a big load at every bite. Handles a large amount of material at very low cost. Can be used for stripping, grading and loading sand, gravel or clay from bank into cars or wagons. Operating and upkeep costs small.

Write for full description.

BAY CITY DREDGE WORKS

BAY CITY MICH.



Successful Shipments

are the "sure enough" proof of good packing.

Here's what another user of the Urschel-Bates Packer and Bates Valve Bags says:

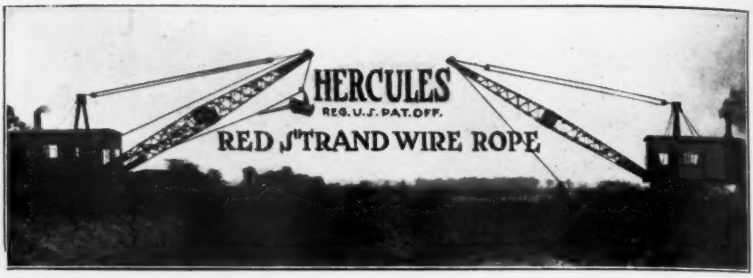
"We are very frank to say that it is the best packing equipment we have ever seen."

Bates Valve Bags

are filled by the Urschel-Bates Packer without mutilation. They seal automatically, are easily handled, and stack close—that's why materials packed in Bates Valve Bags are shipped successfully.

The Valve Bag Company of America
SUCCESSORS TO
THE URSCHEL-BATES VALVE BAG CO.
TOLEDO, OHIO

This is BAGGING TALK No. 12. Watch for No. 13.



Where Durability Means Dollars

You men who operate derricks, dredges, excavators, steam shovels and similar equipment know the excessive wear and tear caused by such work on your Wire Rope.

If the Rope is not extremely durable, it means frequent renewals, and the original price of the wire rope is not the total cost of renewing a cable, for there is the loss of labor and time to be considered.

REG. U.S. PAT. OFF.

HERCULES **(Red Strand)** Wire Rope not only has great strength, but it is also elastic, tough and flexible. The quality of its material combined with its manner and method of manufacture make a rope that is dependable and of maximum durability.

So by using HERCULES **(Red Strand)** WIRE ROPE you are saving time, labor and DOLLARS. Why not make the saving?

Established 1857

A. Leschen & Sons Rope Company

St. Louis, Missouri

New York Chicago Denver San Francisco

JUST off the press—and we want you to have a copy of Bulletin No. 21. Write for it today!

In What Kind of Work are You Most Interested?

WHETHER it's one of the above or any other kind of job suited to a ¾-yard steam shovel, you will want to know more about the Marion Model 21. This attractive bulletin, giving full description and specifications, is yours for the asking.

The Marion Steam Shovel Company

Established 1884 MARION, OHIO

NEW YORK CHICAGO ATLANTA SAN FRANCISCO

Marion

Railroad Grading **Levee Building**
Drainage Ditches **Embankments**
Irrigation Canals **Wagon Loading**
Highway Grading

The History of Railroad and earth construction work for the past 35 years has been the story of THE NEW ERA ELEVATING GRADER.

Old Experienced Contractors still "in the game" as well as many who have "passed along" learned years ago to look upon the "New Era" as the most essential piece of equipment on a successful grading job.

PRESENT DAY road builders have recognized the advantages of the "New Era" in solving their grading difficulties. It is good for both grading and excavating the road bed; in the latter case getting the material out of the grade to the wagon or ditch **in one movement** is a worthwhile labor-saving achievement.

Austin Dump Wagons

are popular with contractors because they are

Easy to load (being low).
Easy on teams (having short wheel base).
Easy to dump (hingeless doors clear the material).

AUSTIN MANUFACTURING COMPANY
CHICAGO

New York **San Francisco**

The Byers' Auto-Crane Gives Service

IT'S AN ALL-AROUND WORKER

The Byers' Auto-Crane can be equipped for straight crane, derrick, or hoisting work; also can be used as a drag-line or back-filler, or a steam-shovel dipper can be attached.

There is no crane on the market selling anywhere near the Auto-Crane price which has a wider range of utility with as low an operation and maintenance cost. Made with road wheels, caterpillar or rail truck mounting. Steam, gasoline or electric power.

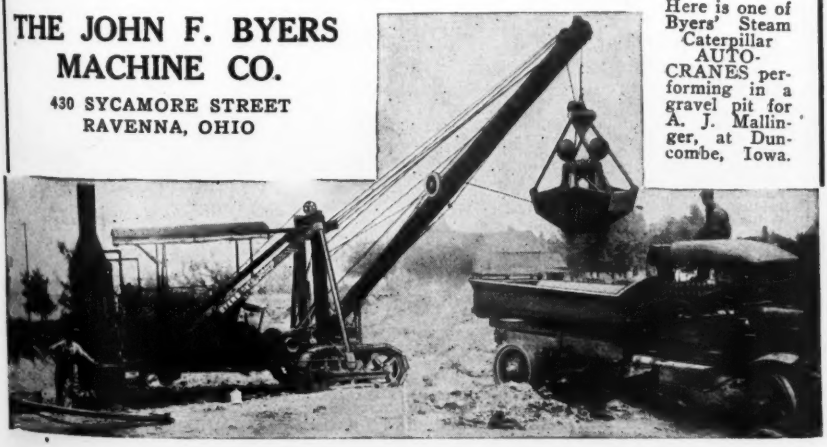
Investigate

There is an Auto-Crane near you, and our engineers will be glad to call, without obligation, to discuss and advise regarding your needs.

We Guarantee It

THE JOHN F. BYERS MACHINE CO.

430 SYCAMORE STREET
RAVENNA, OHIO



Here is one of Byers' Steam Caterpillar AUTO-CRANES performing in a gravel pit for A. J. Mallinger, at Duncombe, Iowa.

50-lb Bricks on a B-G Conveyor!

EVERY man—shoveler, wheelbarrow-handler or what—you keep on your pay roll that can be replaced by a material-handling machine, will continue to be a sapper of your profits.
You can easily solve this difficulty as well as the labor-scarcity problem, and at the same time show a bigger profit on your books, by using the

B-G Standardized Conveyor

The photograph below shows a B-G Conveyor (Style B, 30'x18"), loading and unloading Granite Paving Block at the shops of the Cleveland Railway Company. The blocks weigh in most instances as much as 50 pounds. The firm considered this B-G such a big help that within 3 months after its installation they ordered two additional machines.
This efficient labor-saving machine does the work quicker, with less damage in handling and at a reduction of 50% to 90% in costs.
B-G Conveyors handle coal, coke, cement, gravel, cinders, brick, crushed stone, ashes—in fact, all sorts of package and bulk materials.
B-G Standardized Conveyors are Belt Conveyors—soundly built—portable type (12 feet to 60 feet) and stationary type (in any length)—equipped with electric drive; supplied with gasoline engine when required—operation costs low—working capacity up to 150 tons per hour.

Our Service Department will help you select the B-G Conveyor exact suitable to your needs. Write for interesting literature.

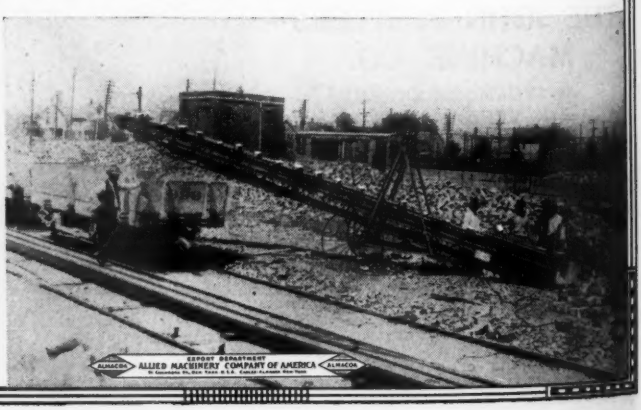
Barber-Greene Company

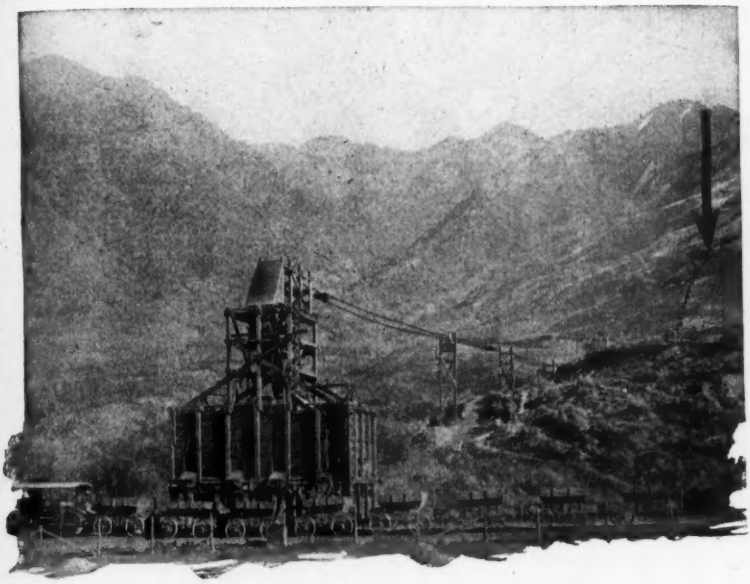
605 West Park Avenue, Aurora, Illinois, U. S. A.
Southern Branch, Birmingham.
Branch Service and Sales Offices:

New York	Indianapolis	Kansas City
Philadelphia	Pittsburgh	Salt Lake City
Norfolk	Scranton	Los Angeles
Salem	Chicago	San Francisco
Hartford	Milwaukee	Portland
Buffalo	Minneapolis	New Orleans
Cleveland	St. Louis	Tampa
Detroit	Omaha	Savannah
Utica		Louisville

Canadian Agents: Mussens Limited, Montreal, Winnipeg, Toronto, Vancouver

Another labor-saving device is the B-G Self-Feeding Bucket Loader, designed for severe service in handling heavy loads. The big feature is its Rotating Disc Feeder (patented). The quickest and easiest method of loading material. Write for information.





Above shows 2500-foot tramway hauling crushed stone down mountain side to discharge terminal 500 feet below receiving terminal.

AUTOMATIC TRAMWAY

Ideal for Quarry or Pit

This automatic Tramway offers a simple, low-cost method of carrying sand, gravel or stone from pit and quarry to discharging bin.

Easy to Install

Tramway is easy to install and operate. It is carried by towers of strong, simple construction.

Low Upkeep and Labor Cost

A minimum of power is required to keep the tramway running, as its motion is continuous—no stopping or starting—both loading and unloading of cars being automatic.

It cuts down labor costs, as it is operated by only one unskilled laborer.

If you have a hauling problem, let us tell you how the Lawson Automatic Tramway can help you.

Write today for our booklet.

Interstate Equipment Corporation

Shops at Roanoke, Virginia

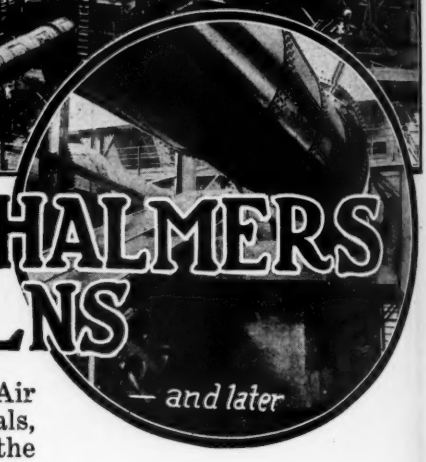
135 Broadway **New York**

▼

Loads and Unloads Automatically

Each car loads itself by automatically opening gate of loading hopper. The hopper is filled from a large receiving bin by the one man required in the operation of the Tramway. Loading does not require stopping the car. The material drops into it while in motion and it continues on its way to the discharging station, where, as it turns over to make the return trip, the material it carries is dumped into the discharging bin.

▲



ALLIS-CHALMERS KILNS

When the huge United States Air Nitrate Plant at Muscle Shoals, Ala., was erected, kilns to burn the tremendous quantities of limestone to be used, formed an important consideration.

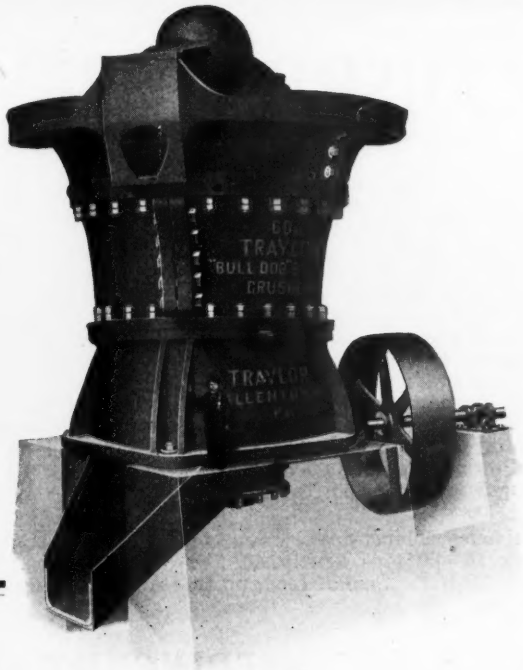
Accordingly a careful selection was made. Allis-Chalmers Kilns were part of the equipment, chosen by lime-producing experts.

Bear this choice in mind for future guidance: Whatever you need for your plant can best be supplied by the Allis-Chalmers organization. Reliable products, free from fantastic features that simply breed complications.

Tell us what equipment you are in need of.

Write to

ALLIS-CHALMERS MFG. CO. Milwaukee, Wis.



Real Crushing Economy

The exceptionally low operating and upkeep costs of the "Bulldog" Gyratories are based on sound points of mechanical superiority. Every feature is the outcome of years of study and investigation to eliminate the weak points of the average gyratory.

TRAYLOR
"Bulldog" Gyratory Crushers

have achieved that ideal. The Bend-Proof Shaft—the Hewes Spider—the larger eccentric—the perfect lubrication—the cut steel gears—every "Bulldog" feature means the utmost of economy in your crushing.

For detailed information—
BULLETIN QGX-1

Traylor Engineering & Mfg. Co.

Allentown, Penna.

NEW YORK 30 Church St. | PITTSBURGH 211 Fulton Bldg. | CHICAGO 1414 Fisher Bldg. | LOS ANGELES Citizens Bank Bldg. | SPOKANE Mohawk Block

RE-CRUSHING SERVICE

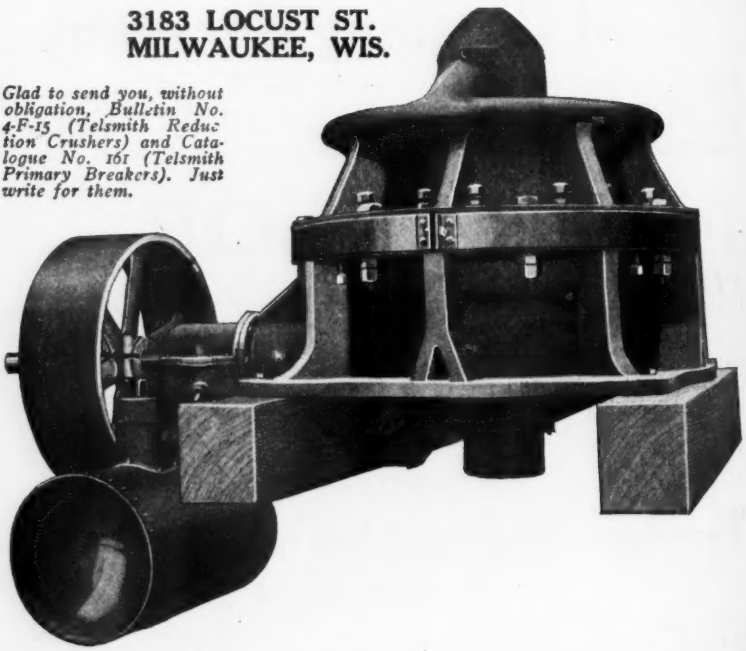
THE No. 4 Telsmith Reduction Crusher is built to follow a No. 7½, No. 8 or No. 9 gyratory or a big jaw crusher (any initial breaker with 2½"—4½" discharge opening) and recrush to ¾"—1½" sizes. It is a massive affair with an unbreakable pillar-shaft and a short frame, walled and hooped to withstand enormous strains. This Telsmith machine has a huge open crushing hopper with big receiving area, a gigantic mushroom-shaped head and a discharge circle about one and a half times the mean feed diameter. It feeds by gravity, without hand or mechanical feed regulation. It discharges by gravity from the base of the crusher, without centrifugal action. On account of the reduced weight in rotation, Telsmith is seldom damaged by tramp iron. Power required, 60-70 H.P. Size of feed, up to 7". Shipping weight, 48,000 lbs.

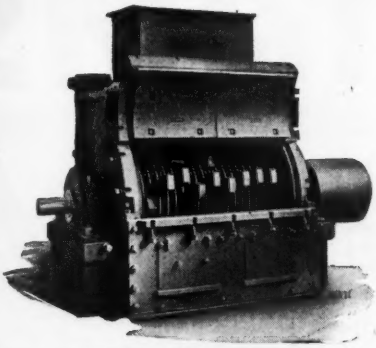
The Telsmith Reduction Crusher is also built in size No. 2, crushing 10—20 tons hourly, ½", ¾" and 1" sizes. Power required, 20 H.P. Size of feed, up to 4½". Shipping weight, 13,600 lbs.

SMITH ENGINEERING WORKS

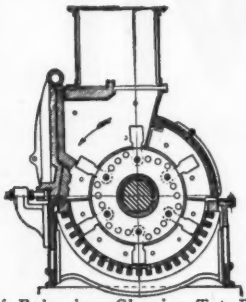
3183 LOCUST ST.
MILWAUKEE, WIS.

Glad to send you, without obligation, Bulletin No. 4-F-15 (Telsmith Reduction Crushers) and Catalogue No. 161 (Telsmith Primary Breakers). Just write for them.





Note: Accessibility, Compactness and Ball Bearings



View of Pulverizer Showing Top Feed

Jeffrey TYPE "B" Ball Bearing Swing Hammer Pulverizer

for Breakdown of Large Pieces of Limestone, Gypsum, Shale, etc.

Leading Cement Mills, Lime Plants, Quarries, Gypsum Plants, etc., are being equipped with Jeffrey Swing Hammer Pulverizers to meet the constantly increasing demand.

Write for Pulverizer Catalog No. 147-K

The Jeffrey Mfg. Co. 990 North Fourth St. **Columbus, O.**

BRANCHES:

New York, Philadelphia, Pittsburgh, St. Louis, Dallas, Scranton, Montreal, Boston, Cleveland, Chicago, Birmingham, Milwaukee, Denver, Detroit, Seattle

Manufacturers of Pulverizing, Conveying and Elevating Machinery; Chains; Self-Propelling Loaders; Electric Trolley and Storage Battery Locomotives, etc.

Handle it Mechanically

WILLIAMS

2--IN--1 CRUSHER

This machine will take Limestone, Lime, Gravel or Gypsum in cubes 14" x 16" and under, depending on size of crusher, and in one operation reduce same to 2", 1", ¾", ½", ¼", ⅛" or finer. Capacities range from 1½ to 40 tons per hour. Outstanding features are: Low Horse Power, Slow Speed, Small Floor Space, and instant adjustment for any size product desired. Complete information given in

Bulletin No. 58

General Sales Dept.
37 W. Van Buren St.
Chicago

Western Office:
67 Second Street
San Francisco

No. 20 Champion Steel Rock Crusher —Patented Receiving Opening, 22"x50". Capacity, 100 tons per hour.

A Champion for Every Need

There is a Champion Rock Crusher for every kind of work. Let us help you select the one designed for your particular needs.

You may depend upon the Champion to yield the utmost in satisfaction. About six thousand Champion Rock Crushers are in active service today. Quarry men everywhere are using them.

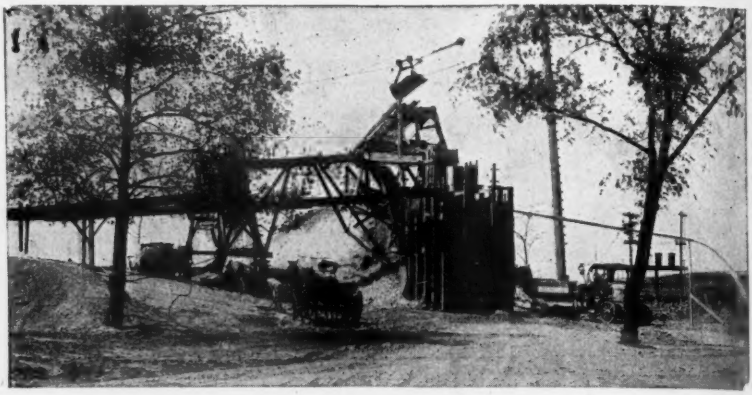
We shall be pleased to send you complete specifications and prices. Write us today.

The GOOD ROADS Machinery Co., Inc.

Crushing, Elevating, Screening and Conveying Equipment

General Sales Offices:
833 Bulletin Bldg., Philadelphia, U. S. A.

Branch Offices in All Principal Cities



WHY NOT MODERNIZE YOUR GRAVEL PIT

With a

PIONEER SLACK LINE EXCAVATING OUTFIT

Lowest Initial Cost

Operated by One Man

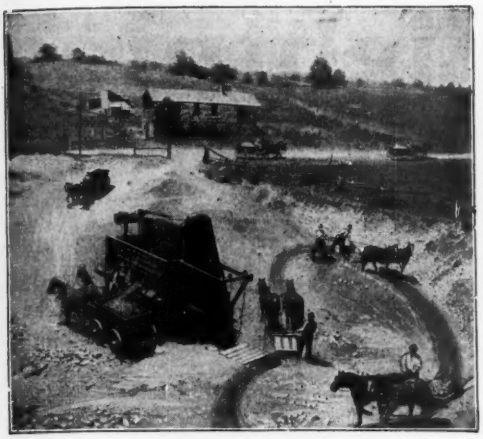
Few Parts to Get Out of Order.

Let Us Send You This Booklet

The Mansfield Engineering Co.

Fletcher Savings & Trust Bldg.

Indianapolis, Ind.



GALION EQUIPMENT

in

PITS AND QUARRIES

Means That Things Go with a Snap and Jump!

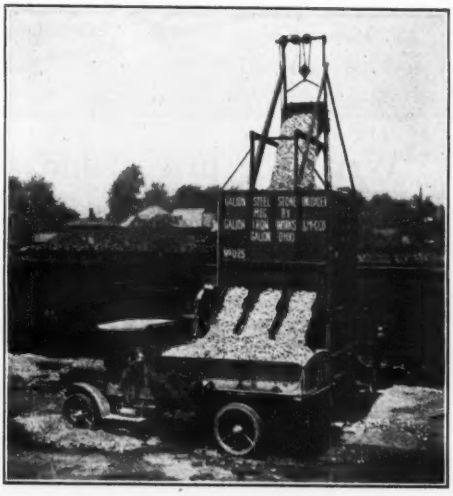
GALION Loaders and unloaders and combination screening plants and loaders are remarkable time and labor saving agents for pits and quarries. When GALION equipment gets on the job, things begin to hum all along the line.

For example: A GALION UNLOADER can unload 500 to 600 TONS of stone PER DAY, keeping trucks or wagons going at top speed. A machine of this kind releases labor urgently needed elsewhere on the job and thus solves the labor problem, as well as greatly INCREASING PROFITS.

Production is Speeded Up and

PROFITS INCREASE

We have issued some very interesting bulletins. Shall we send you one?

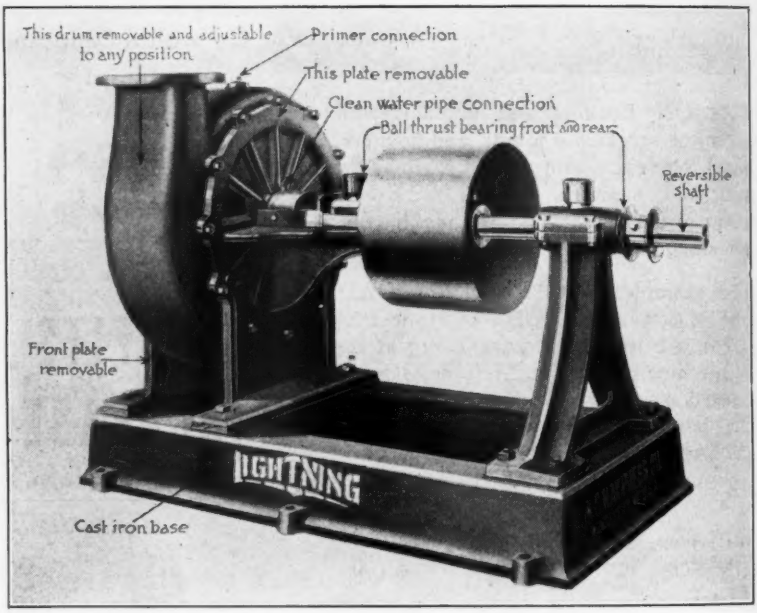


THE GALION IRON WORKS AND MFG. CO.

GALION, OHIO

The Lightning Sand Pump

The ideal pump for sand companies and contractors—easy to operate, easy to adjust, easy to replace parts.

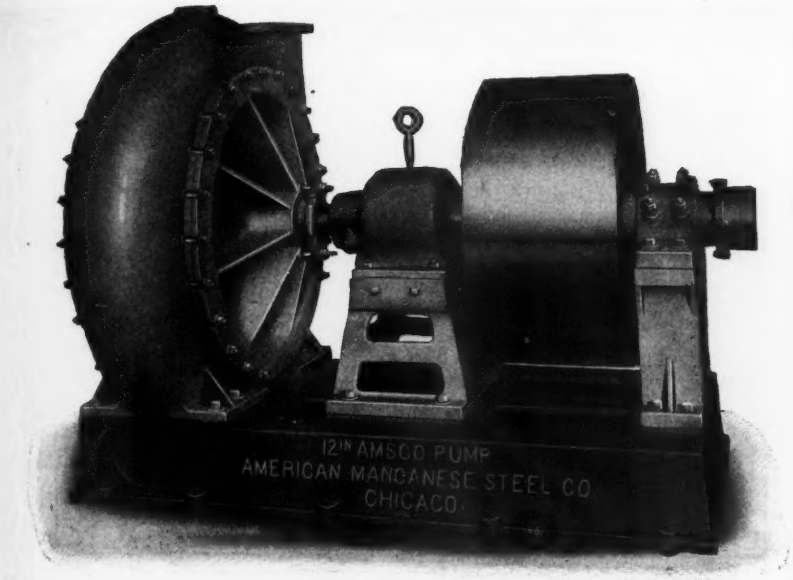


Write for prices and full information.

Address Pump Dept.

Kansas City Hay Press & Tractor Company

Kansas City **Missouri**



AMSCO

Sand and Gravel Pumps Are Dependable Producers

Of rugged construction, built for hard service. Parts exposed to abrasive wear and constant grinding action are made of manganese steel.

The side plates are fastened to shell by bolts in slotted flanges, doing away with troublesome studs. Solid ring gaskets are used. Suction Side Plate projects into runner. Engine side plate has large packing gland and water seal.

Extra heavy shaft, sturdy bearings, ball bearing thrust collar and well balanced runner make the AMSCO pump a smooth running and efficient machine.

AMSCO pumps save delays and reduce operating costs.

Made in standard 6, 8, 10, 12 and 15 inch sizes, also special and larger sizes to suit conditions.

AMSCO flap valves, pipe, and elbows.

Write for Pump Bulletin

American Manganese Steel Co.

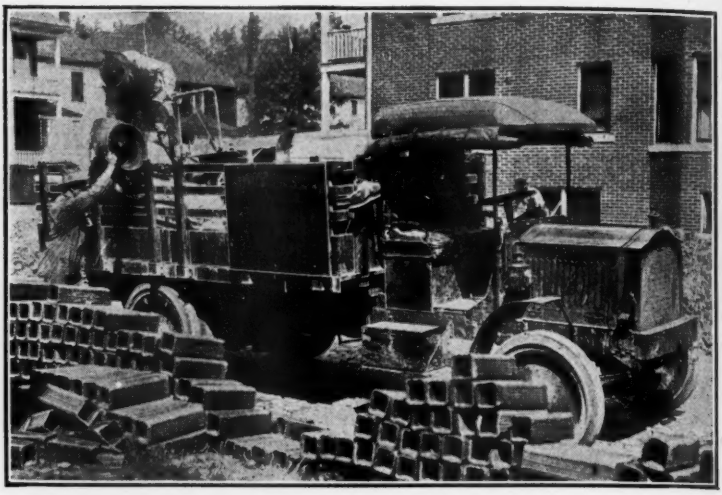
General Offices: 1875 McCormick Building, Chicago

Western Sales Office: Newhouse Bldg. Salt Lake City

Pacific Coast Office: Insurance Exchange Bldg. San Francisco, Calif.

Eastern Sales Office: Hudson Terminal Bldg. New York City

Foundries: Chicago Heights, Illinois—New Castle, Delaware—Oakland, California



Handling bulky materials with a Packard Truck. There is a Packard for every variety of load

Where Packard Speed in Deliveries Counts Heavily in Profits

EVERY dealer in builders' supplies has felt the increasing pressure upon him for a continuous flow of materials.

For five years an Atlantic City dealer has maintained a constant movement of supplies with practically no delays. His Packard Truck averaged 25½ days a month and 7½ hours a day on the road in the past six months, with but 4 hours lay-up for repairs in all that time.

It is in just such problems of continuous movement that the uniform quality of Packard Trucks is most valuable.

Every part of every Packard Truck is controlled by Packard through foundry, forge, machining and finishing —each truck is a Packard engineering unit, tested by Packard every step of the way.

The Packard business is not a business of assembling parts made here and there. It is not a trade in repair parts.

It is a business of building trucks for the man who wants *transportation* every working hour of every working day.

Packard engines are run on the block to an equivalent of 1000 miles road service. A Packard Truck is ready to do a full day's work the very day *it is delivered.*

"Ask the Man Who Owns One"

PACKARD MOTOR CAR COMPANY, *Detroit*

DUPLEX TRUCKS

BUILT FOR BUSINESS

ALLIED MINING & MILLING CO.

Silver Peak, Nevada,
April 3, 1919.

Dear Sir:

You are at liberty to use something of this sort, for we are happy to give an endorsement to the performance of the Duplex we bought last year, if you wish:

Steep grades, sand, and rough roads leading to the Allied mine in Palmetto Mountains, 8,000 feet above sea level, held no terrors for the Duplex. We replaced ten-horse freight outfit with the four-wheel drive motor truck, picking on the Duplex because of the heavy grades. The car gave satisfaction. We cut hauling costs on ore 40 per cent and you can count on us as being Duplex boosters all the way.

By Dave Trepp,
General Manager.

Duplex Limited

Medium Capacity—
Two Wheel Drive—
High Speed—$2,575
F. O. B. Lansing

DUPLEX 4-Wheel Drive Trucks are typical examples of American progress. They occupy a prominent place in every line of the mining business and their prestige is permanently fixed in the minds of business men.

Yet it is little wonder that increasing numbers of mining companies are learning about Duplex performance and applying it to their own business. Merit soon establishes a standard and the buying public are quick to sense a leader.

Duplex truck success is due to a number of things but mainly to their performance—their dependability. Profitable truck operation can come only from constant service.

Get all the facts about Duplex Trucks. You will find them interesting and perhaps profitable.

Duplex 4-Wheel Drive

3½-Ton Capacity. Price $4250, f. o. b. Lansing

Duplex Truck Company
Lansing · Michigan

One of the Oldest and Most Successful Truck Companies in America

Basic Strength

Paige Motor Trucks have the basic strength to perform the unusual task as well as the usual. No work can impose a burden too heavy for Paige strength, a task too brutal for Paige endurance-qualities.

Into every Paige truck is built the stamina to keep it on the job uninterruptedly, day after day and year after year. By its faithful performance and sturdy dependability, it is continually justifying its right to be called "The Most Serviceable Truck in America."

Paige reputation grows with each successive truck that bears the Paige nameplate. The reliable character of Paige service has won for it the spoken approval of Paige owners everywhere.

Ever since the Paige nameplate first appeared ten years ago, it has been relied upon as the symbol of an institution rather than as the mark of a product. We take pride in the fact that this faith reposed in us as an institution has never been violated.

PAIGE-DETROIT MOTOR CAR COMPANY, DETROIT, MICHIGAN

Manufacturers of Paige Motor Cars and Trucks

PAIGE

The Most Serviceable Truck in America

MOTOR TRUCKS

HUM-MER SEPARATOR For Screening Silica Gravel Sand Limestone and All Other Rock Products

HUM-MER Vibration So Intense

it is painful to finger tips

If you were to rest your finger tips on a HUM-MER screening surface, you would readily understand why the HUM-MER produces such wonderful results, as the vibration is so intense that it is painful to the finger tips.

In the HUM-MER Separator, high-speed, electro-magnetic vibration is applied directly to a smoothly stretched, taut screening surface.

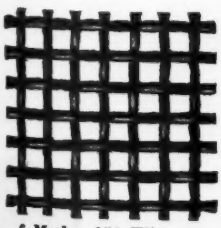
This electrical vibration can be adjusted to any degree of intensity, and can be varied to produce the highest efficiency on either coarse or fine materials.

HUM-MER VIBRATION means increased tonnage and close separation. Samples of any material will be tested on the HUM-MER without charge.

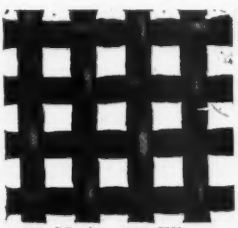
THE W. S. TYLER COMPANY

Manufacturers of Woven Wire Cloth. **CLEVELAND, OHIO**

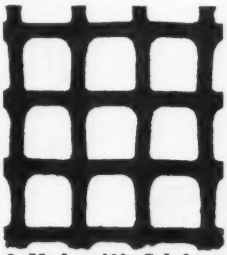
Write us about your wire cloth requirements



6 Mesh; .054 Wire



3½ Mesh; .135 Wire



3 Mesh; .080 Galvd.

CONVEYOR BELTING

Do you have a difficult job in keeping your conveying costs down?

Low initial costs don't necessarily mean you have secured the most economical belt for your individual use.

How does it check up when length of service, tonnage conveyed or loss of time for belt repairs is considered?

DESERT

Is a consistent deliverer of large tonnage of conveyed material; eliminates the costly shut downs for belt repairs and stays in service for a long time, thus commanding the respect of all users who need a high grade belt for their work.

DESERT is constructed of extra heavy duck, each ply of which is held together by a friction so strong that it resists separation to the utmost. The cover is of a quality that successfully withstands the action of sand, gravel, stone, cement and other materials being conveyed.

Let us figure on your belting requirements. Estimates and samples gladly submitted.

QUAKER CITY RUBBER CO.

Manufacturers of Mechanical Rubber Goods

Philadelphia 629 Market St. Chicago 182 W. Lake St. Pittsburgh 211 Wood St.
New York, 53 Murray St.

SUCCESSFUL
QUARRYMEN
ARE USING
EXPLOSIVES
MADE BY

GENERAL
EXPLOSIVES
COMPANY

72 WEST ADAMS STREET
CHICAGO

JOPLIN, MO. ST. LOUIS, MO.
BIRMINGHAM, ALA.

Hercules Explosives for the Quarryman

WE are facing a great era of construction; an era of heavy demand for all quarry products.

The questions of production and costs are of vital importance to the quarryman and the solution of these questions depends to a large extent upon the explosives he uses.

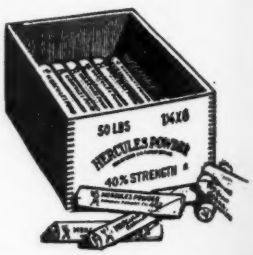
Hercules Powders are increasing the output and cutting costs in thousands of quarries. *And they can do it in yours.*

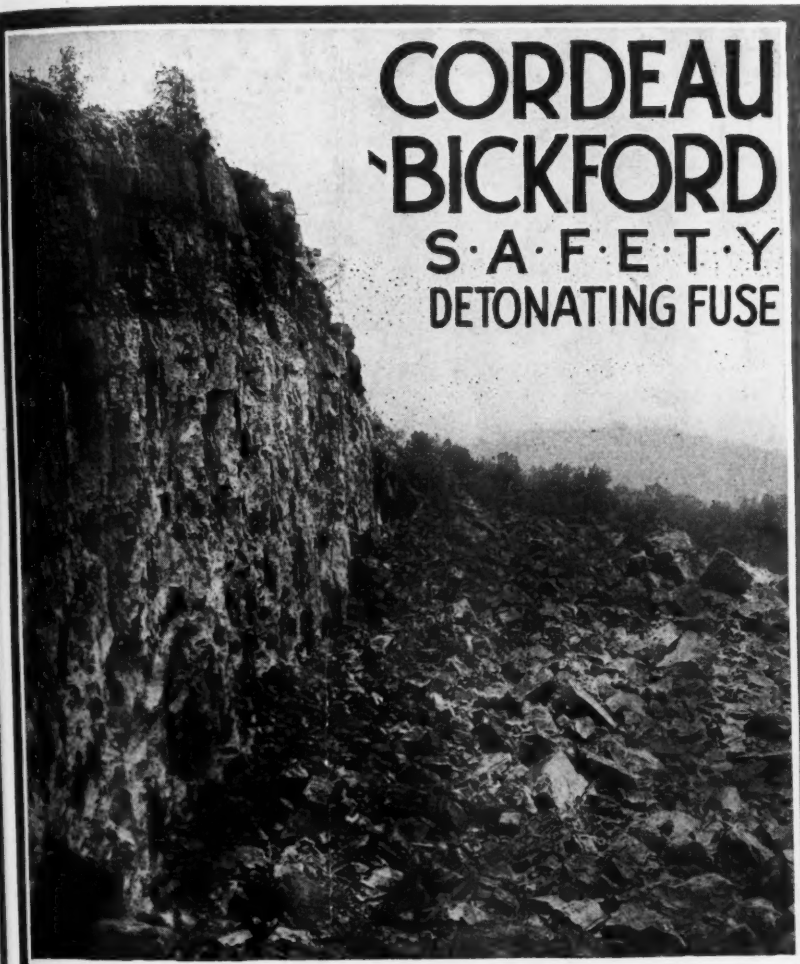
If you have any special blasting problems write the nearest office of the Hercules Powder Co. Our Service Department will be glad to advise you or, if the occasion warrants it, to send a man to demonstrate in your own quarry the efficiency of Hercules Dynamite

HERCULES POWDER CO.

Chicago	St. Louis	New York
Pittsburg, Kan	Denver	Hazleton, Pa
San Francisco	Salt Lake City	Joplin
Chattanooga	Pittsburgh, Pa	Wilmington, Del.

HERCULES DYNAMITE





After the Blast

CORDEAU-BICKFORD
DETONATING FUSE

should be used to detonate the explosive charge wherever the well drill method of blasting is used.

Cordeau is safe. It is practically instantaneous. It is economical. It adds from 10% to 20% to the efficiency of the explosive.

Write for Booklet Today!

The Ensign-Bickford Company
Original Manufacturers of Safety Fuse
Established 1836
SIMSBURY, CONNECTICUT

Atlas Explosives

have reduced *blasting* costs and —by breaking the rock right— have reduced *handling* costs in every class of quarry work.

One reason why Atlas Powders are preferred by so many of the largest quarrymen, miners and contractors is that the explosives engineers of the Atlas Service Division take a personal and permanent interest in the way Atlas Powders are used. They co-operate with quarrymen to secure the proper balance between cost of explosives and cost of drilling and between blasting efficiency and rock loading efficiency. Frequently they are able to suggest changes in methods or in explosives that save their clients thousands of dollars.

Our Service Men will gladly co-operate with you. They will go anywhere to help in reducing blasting costs without obligation to you. Put your blasting problems up to us.

ABOVE: Face in quarry of Dixie Portland Cement Company, Richard City, Tenn., before the blast. BELOW: The effect of the blast in which 32,000 pounds of Atlas Explosives were used, loaded in well holes. Atlas Service Men have assisted at many of the largest well-drill blasts ever fired.

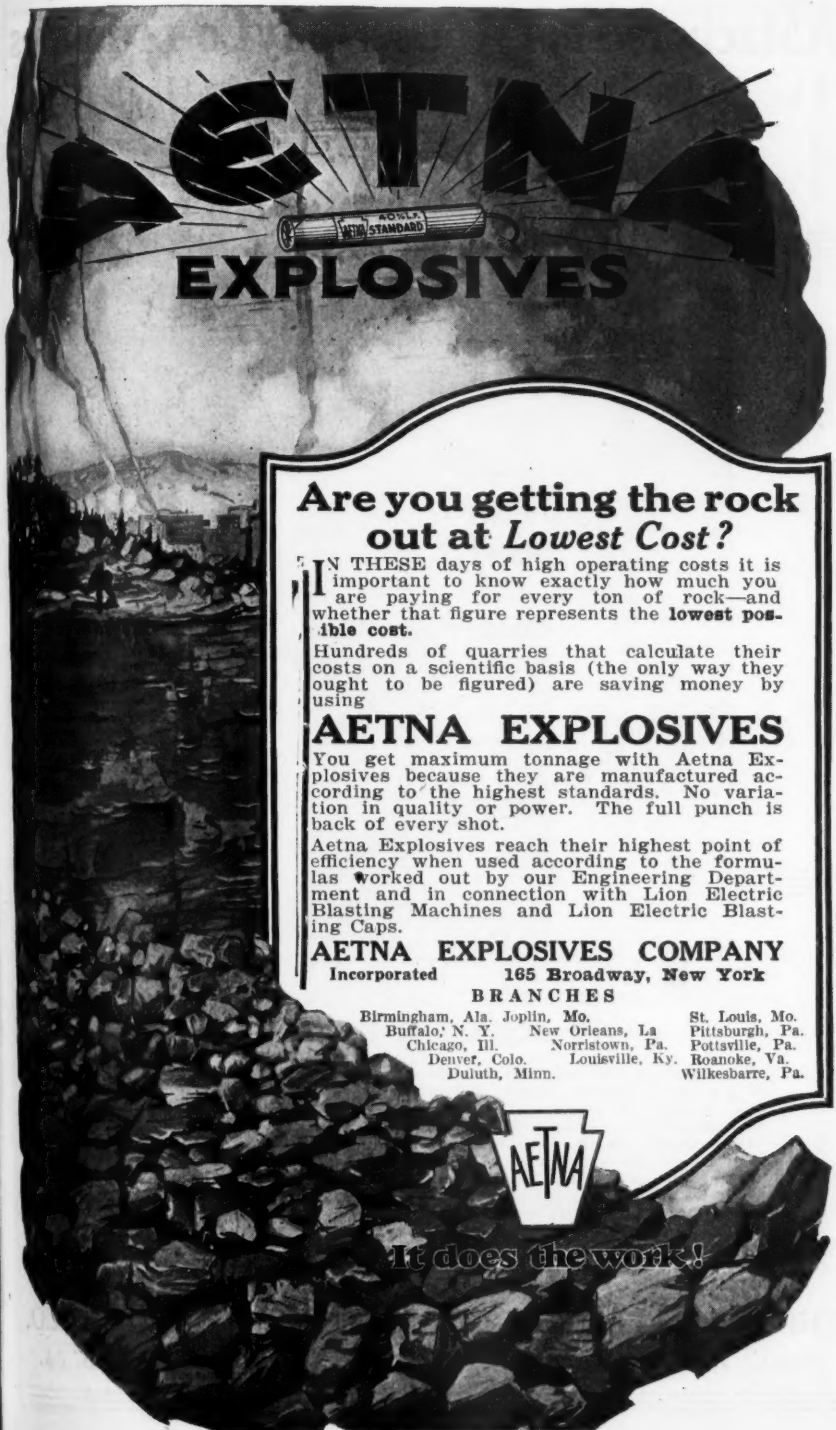
ATLAS POWDER CO.

140 North Broad Street,
PHILADELPHIA, PA.

Branch Offices: Allentown, Pa.; Birmingham, Ala.; Boston; Chicago; Des Moines, Ia.; Houghton, Mich.; Joplin, Mo.; Kansas City; Knoxville; McAlester, Okla.; Memphis; Nashville; New Orleans; New York; Philadelphia; Pittsburg, Kans.; Pittsburgh, Pa.; Pottsville, Pa.; St. Louis; Wilkes-Barre.

ATLAS EXPLOSIVES

break the rock right



Are you getting the rock out at *Lowest Cost?*

IN THESE days of high operating costs it is important to know exactly how much you are paying for every ton of rock—and whether that figure represents the **lowest possible cost.**

Hundreds of quarries that calculate their costs on a scientific basis (the only way they ought to be figured) are saving money by using

AETNA EXPLOSIVES

You get maximum tonnage with Aetna Explosives because they are manufactured according to the highest standards. No variation in quality or power. The full punch is back of every shot.

Aetna Explosives reach their highest point of efficiency when used according to the formulas worked out by our Engineering Department and in connection with Lion Electric Blasting Machines and Lion Electric Blasting Caps.

AETNA EXPLOSIVES COMPANY

Incorporated **165 Broadway, New York**

BRANCHES

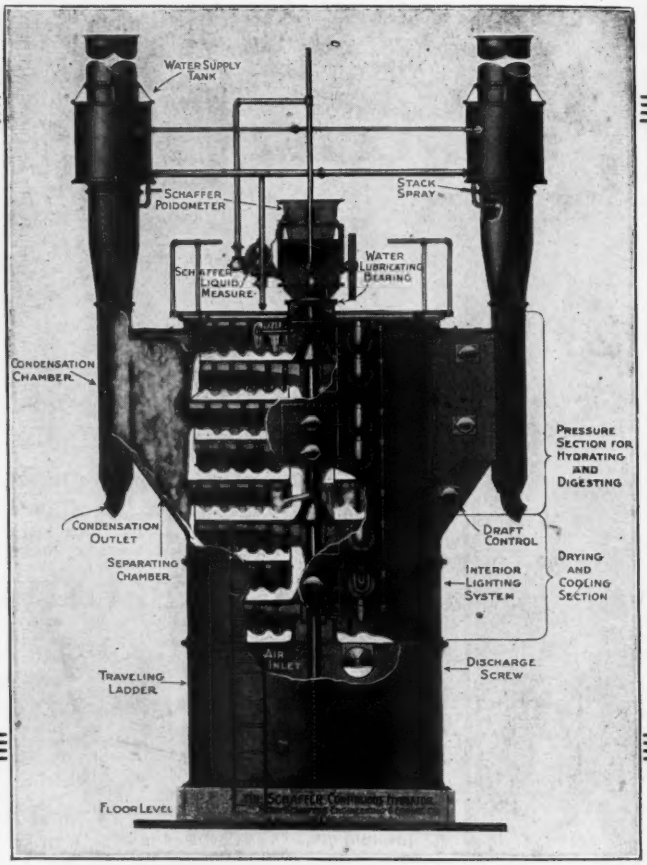
Birmingham, Ala. Joplin, Mo. St. Louis, Mo.
Buffalo, N. Y. New Orleans, La Pittsburgh, Pa.
Chicago, Ill. Norristown, Pa. Pottsville, Pa.
Denver, Colo. Louisville, Ky. Roanoke, Va.
Duluth, Minn. Wilkesbarre, Pa.

AETNA

It does the work!

A Machine That Wonderfully Co-ordinates

The Essentials of Successful Hydrating



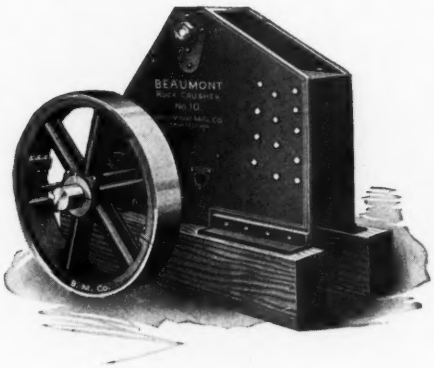
THE SCHAFFER HYDRATOR

Will operate continuously and automatically.
Will produce a superior quality of finished product.
Will operate with entire satisfaction on either high calcium or dolomitic limes.
Will effect a greater saving in labor.
Will permit of the greatest capacity on finishing mills.
Will prevent re-crystallization of very quick limes.
Will produce the greatest percentage of amorphous product.
Will give flexibility in operation to meet any market conditions.
Will properly co-ordinate with other working units of the plant.
Will occupy less space, capacity considered.
Will consume less power, capacity considered.
Will produce a product superior to any competing machine or process.
Will give satisfaction in every way.

THE SCHAFFER ENGINEERING & EQUIPMENT CO.

Peoples Bank Building **PITTSBURGH, PA.**

Beaumont Rock Crusher



It is easy to understand why the BEAUMONT CRUSHER has attained an enviable reputation in this country and abroad. It gives service, being rugged, economical, and dependable. It is built along lines best suited to highly efficient crushing. All lost motion is practically eliminated. The main or cam shaped shaft gives two strokes to the crushing jaw every complete revolution of the flywheel. This eliminates wear on moving parts due to excessive speed. Other crushers using eccentric shafts give only one.

Beaumont Elevator

The slow speed of the continuous elevator makes it especially suitable for handling stone. The close arrangement of the buckets means that the stone can be spouted directly into them thus eliminating the excessive wear incident to scooping up abrasive materials.

Get Our Catalog 42

Write for prices on Beaumont Crushers, Elevators, Screens, etc.

BEAUMONT MFG. CO.

324 ARCH ST. PHILADELPHIA

New York City, 50 Church St.; Pittsburgh, Bessemer Building; San Francisco, 461 Market Street; Charlotte, N. C., Byron C. Scott; Middle Western, Machinery Sales Co., Old Colony Bldg., Chicago.

EASTON CARS "on the job"

Your share of that $633,000,000 that, it has been estimated, will be spent on the roads of this country during 1920 will be big or little *according to your facilities.*

Handling large quantities of crushed stone economically calls for an industrial railway system of some sort. And the more closely the system fits the particular situation, the greater the economy.

Easton Industrial Railway Service includes not only the intelligent layout by engineers with a quarter of a century's experience in that particular work, but the manufacture of the proper cars—specially designed, if some one of the great variety of standard Easton cars will not best serve—and the track, switches, turntables and minor details of the equipment.

Easton experience is matched by Easton manufacturing facilities—both at your disposal for increased economy in your plant. Our recommendations await only the details of your problem—and with no obligation to you.

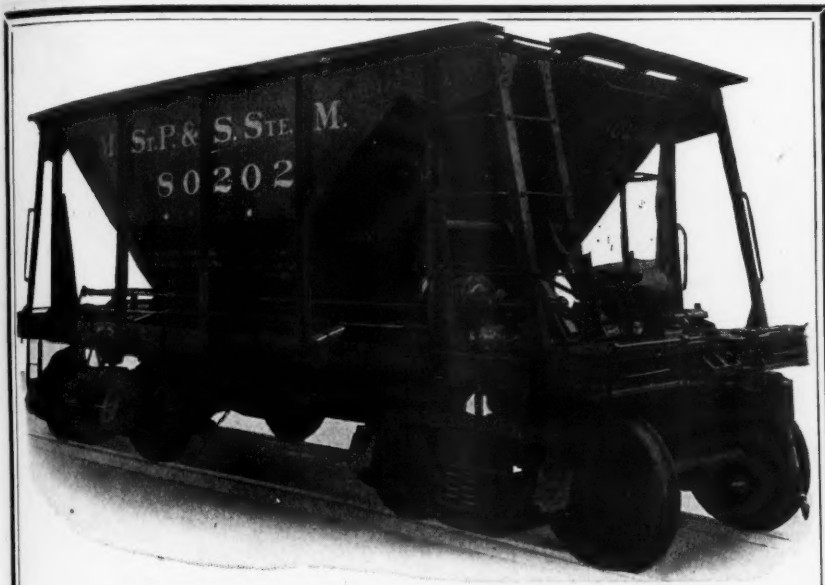
EASTON CAR & CONS'T'N CO.

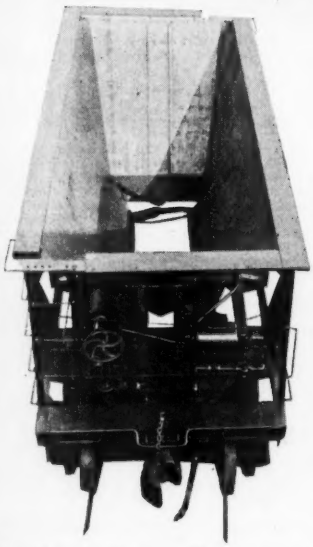
CHURCH AND DEY STREETS, NEW YORK

Factory: Easton, Pennsylvania

Boston Chicago Detroit Philadelphia Pittsburgh

2057-E





Mr. Sand Man:-Years of service have proven this to be the PERFECT CAR for Sand and Gravel or Pit and Quarry, absolutely tight for hauling, entirely self clearing when dumped, built to all sizes Consult us before buying cars. Our engineers are at your service without cost.

Yours very truly,

NATIONAL DUMP CAR COMPANY

H. S. Hart.

Chicago. Ill. President.

Big Blast-Hole Drilling in Trap Rock and Granite

Conditions That "Warm-Up" The Metal Of A Blast-Hole Drill

"DOWN EAST" they have little else but the hardest kind of rock. Trap, granite and other igneous formations predominate. Even the limestones are the toughest in the world, and are filled with faults and seams.

The crushed stone quarries of the Appalachian belt and the New England states were the last to be convinced that the well drill method of blast hole drilling and shooting resulted in the cheapest stone ever produced. There was a reason.

In the early days of the Big Hole Method of Drilling and Blasting, ordinary water well outfits were put on the job. These outfits managed to "get by" for a while in some of the softer rock quarries of the middle west. They lasted long enough to prove the worth of the principle of the new system of quarry operation and until it was evident that Big Blast Hole Drilling was not a well drilling proposition.

But the eastern quarry operators were more conservative—perhaps cynical. They had to be shown. A few miserable failures in the beginning had almost ruined the chances of the new system altogether.

Today there are very few large quarries in the east that are not using the Big Hole Method of drilling and blasting and **you will find that most of the drills are Cyclone No. 14's.** The extremely hard rocks of the sections in question present the most difficult drilling conditions to be found anywhere. A blast-hole drill is required that will stand up under the most severe punishment to which a drilling outfit may be subjected. It must be a machine of speed, but primarily a machine of strength and endurance.

The Cyclone No. 14 Machine has cast steel at every point of wear and strain. The sills and derrick timbers are of straight-grained Oregon Fir. All the machinery is placed low on the main frame, resulting in solidity and freedom from twisting and wracking. The drilling mechanism is so designed as to give the maximum number of strokes per minute in handling tools of the proper weight to meet the drilling conditions at hand.

These are the reasons why the Cyclone No. 14 dominates in trap rock, granite and limestone quarries of the east, and why the No. 14 has earned and maintained its reputation as the "Best Big Blast-Hole Drill on Earth."

The above illustration shows a Cyclone No. 14 Drill in the trap rock quarry of the Eagle Rock Quarry Co., East Orange, N. J. This machine has been operating for eight years under conditions which are better interpreted by the photograph. We would be very glad to furnish you with the names of other trap rock and granite quarries using the No. 14 machine or names of users in your locality.

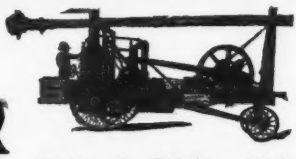
The No. 14 Cyclone Blast-Hole Drill is guaranteed to drill more holes at less cost than any other big blast-hole drill on the market. We will put this in your sales contract—or, we will place one of our outfits in your quarry against any or all other makes. If the Cyclone does not out-drill and out-wear all other outfits we will remove it from the work without cost to you.

THE SANDERSON-CYCLONE DRILL COMPANY

ORRVILLE, OHIO

Eastern and Export Office: 1778 Broadway New York City

THE CLIPPER



BLAST HOLE DRILL

The fact that the "CLIPPER" BLAST HOLE DRILL is used by the largest and best buyers of such machinery in the world is better proof of superiority than all the "big claim" advertisements that can be written in a month!

Among our hundreds of large customers, many of whom have bought from TEN to SEVENTEEN machines from us, we are proud to name the following:

If all these big concerns use the "CLIPPER" why not You?

Kelley Island Lime & Transport Co.
Mich. Limestone & Chemical Co.
Michigan Alkali Co.
France Stone Co.
Brownell Improvement Co.
Standard Lime & Stone Co.
Solvay Process Co.
Bethlehem Steel Co.
Jones & Laughlin Steel Co.
Lackawanna Steel Co.
Blair Limestone Co.
The Lehigh, The Alpha, The Atlas
The Alsen, The Coplay, The Vulcanite
The Whitehall, The LaSalle, and
The South-Western Portland Cement Companies
General Crushed Stone Co.
Tomkins Cove Stone Co.
Bessemer Limestone Co.
National Lime & Stone Co.
Greenville Stone & Gravel Co.
Lee Lime Co.
Ladd Lime & Stone Co.
A. T. Small Quarries Co.
W. W. Boxley Co.
Canada Cement Co.
Cornwall Ore Bank Co.
Connecticut Lime Co.
Dominion Mines & Quarries Co.
Ford Plate Glass Co.
Owens-Bottle Machine Co.
Toledo Stone & Glass Sand Co.
Derry Glass Sand Co.
Wayne Coal Co.
Adena Coal Co.
Danville Brick Co.
Lake Shore Shale Brick Co.

And hundreds of others of greater or less magnitude.

They are made for Steam, Gasoline, Compressed Air or Electric Power

The Loomis Machine Co.

TIFFIN, OHIO

IF YOU DON'T SEE

WHAT YOU

WANT

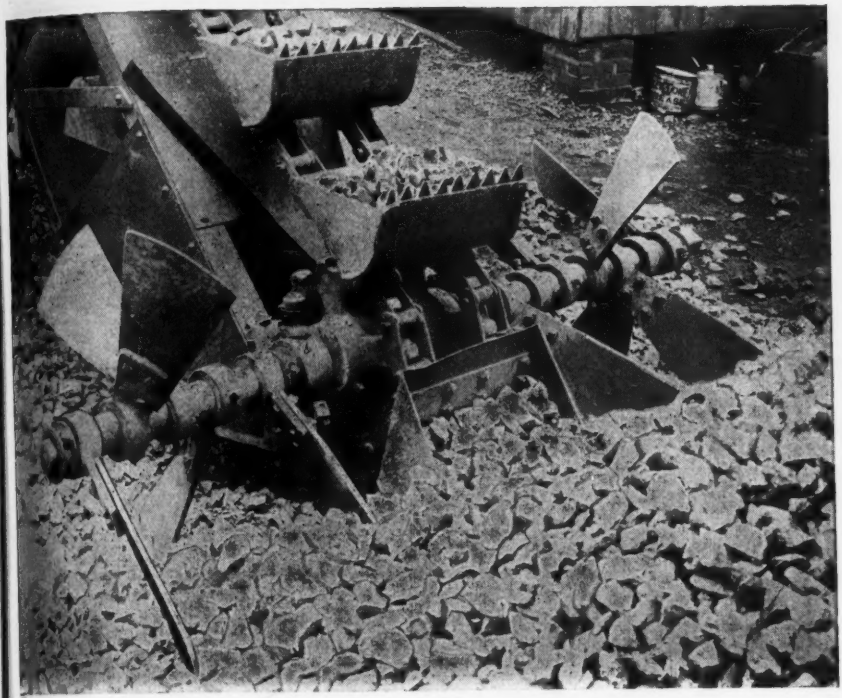
ADVERTISED

Write

PIT *and* QUARRY

Rand McNally Bldg.

CHICAGO



12 Blades = 12 Men

but only for a very few minutes, then the men become exhausted.

Why pay 12 weekly wages to men who can only equal for 5 minutes the output of the powerful

Haiss "Path Digging" Wagon Loader,

which is equipped with the patented self-feeding propeller, with the self-crowding mechanism and with the self-propelled chassis?

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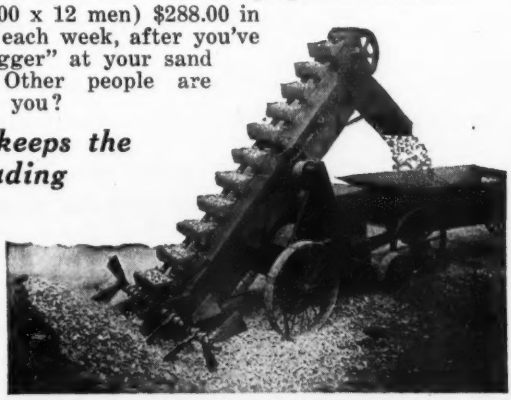

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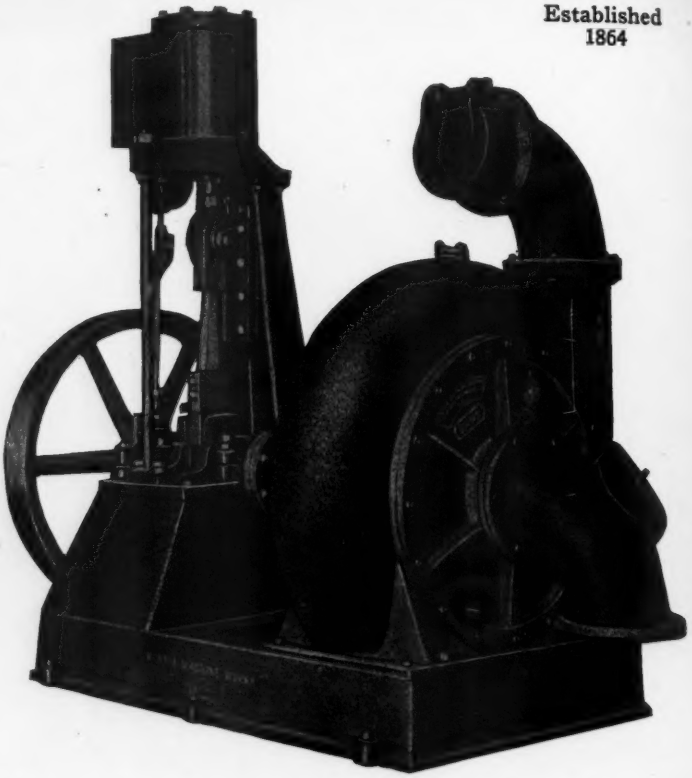

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Pit and Quarry

A Monthly Journal for Producers of Sand, Gravel, Stone, Cement, Gypsum and Lime
Member Audit Bureau of Circulations

VOL. 4 CHICAGO, ILL., FEBRUARY, 1920 NO. 5

Index to Advertisers

Advance Engineering Co. 116
Advance Pump & Compressor Co. 117
Aero Pulverizer Co. 131
Aetna Explosives Co. 37
Allis Chalmers Mfg. Co. 18
American Manganese Steel Co. 27
American Pulv. Co. 120
Arnold & Weigel 119
Atlas Engineering Co. 125
Atlas Powder Co. 36
Austin Co., Inc., F. C. 127
Austin Mfg. Co. 14

Bacon, Earl C. 117
Ball Engine Co. 3
Barber-Greene Co. 16
Bates Valve Bag Co. 103
Bay City Dredge Works 10
Beaumont Mfg. Co. 39
Bell Locomotive Works 101
Bradley Pulverizer Co. 121
Brown Portable Conveying Machy. Co. ... 125
Buchanan Co., Inc., C. G. 48
Buffalo Wire Works 128
Burnham, R. E. 115
Butterworth & Lowe 116
Byers, J. F., Machine Co. 15

Caldwell & Son, H. W. 97
Chicago Elec. Const. Co. 113
Chicago Perforating Co. 118
Clover Leaf Machine Co. 140
Columbus McKinnon Chain Co. 122
Cooley Bros. 107
Coyle & Roth 128
Crescent Belt Fastener Co. 103
Curtis Pneumatic Machy. Co. 138

Dake Engine Co. 141
Dick Co., Inc., R. & J. 132
Donahoo Co., J. F. 111
Duplex Truck Co. 29

Easton Car & Const. Co. 40
Ensign Bickford Co. 35
Equipment Corp. of America 105
Erie Pump & Engine Works 138
Erie Steam Shovel Co. 3

Fate-Root-Heath Co. 6

Gallon Iron Works 25
Gandy Belting Co. 115
General Explosives Co. 33
Gifford Wood Co. 136
Good Roads Machy. Co. 23
Gregory Electric Co. 113
Grimshaw Co., Wm. B. 111
Grunder Pat. Crusher & Pulv. Co. 118

Haiss Mfg. Co., Geo. 45
Hardsoeg Wonder Drill Co. 4
Harrington & King Perforating Co. 129
Heil Co. 132
Hendrick Mfg. Co. 129
Hercules Powder Co. 34
Hoisting Machy. Co. 114
Howe Chain Co. 123
Hubbard-Floyd Co. 115

Ideal Engine Co. 127
Indianapolis Cable Excavator Co. 117
Insley Mfg. Co. 126
International Clay Machy. Co. 119
Interstate Equipment Co. 17

Jeffrey Mfg. Co. 21

K-B Pulverizer Co. 120
Kansas City Hay Press & Tractor Co. ... 26
Kennedy Co., W. E. 110
Kingsford Foundry & Mach. Wks. 131
Klein & Co., Nathan 114
Kleinhaus Co. 105

Leschen & Sons Rope Co., A. 12
Letson Co. 110
Lidgerwood Mfg. Co. 140
Lima Locomotive Works 8
Link-Belt Co. 99
Locomotive Crane Co. of America 5
Loomis Machine Co. 43

McCord Mfg. Co. 142
McFarlane-Eggers Machy. Co. 117
"Manierre" 118
Machinery Sales Co. 106
Mansfield Engr. Co. 24
Marion Steam Shovel Co. 13
Massey Co., Geo. B. 119
Marsh-Bothe Machy. Co. 111
Mayer, F. 107
Midwestern Co. 113
Milrose Co. 114
Moore Bros. 112
Morris Machine Works 46

National Dump Car Co. 41

Osgood Co. 130

Packard Motor Car Co. 28
Paige-Detroit Motor Car Co. 30
Pittsburgh Iron & Steel Foundries 142
Portable Machinery Co. 124
Power Manufacturing Co. 133

Quaker City Rubber Co. 32
Railway Motor Car Co. of America 109
Raymond Bros. Impact Pulv. Co. 143

Sackett Screen & Chute Co., H. B. 118
Sanderson-Cyclone Drill Co. 42
Sauerman Bros. 70-71
Schaeffer Engineering & Equip. Co. 38
Smith & Co., L. F. 108
Smith Engineering Works 20
Stephens-Adamson Mfg. Co. 2
Sunbury Mfg. Co. 124
Superior Iron Works 130

Taylor Chain Co., S. G. 122
Terry Mfg. Co., E. F. 116
Thomas Elevator Co. 141
Track Equipment Co. 126
Traylor Engineering & Mfg. Co. 19
Tyler Co., W. S. 31

Union Chain & Mfg. Co. 116
United States Chain & Forging Co. 123
United States Rubber Co. ..... Front Cover
Universal Road Machy. Co. 121
Used Equipment Bargains 104-115

Valve Bag Co. of Am., The 11
Vulcan Iron Works 9

Watt Mining Car Wheel Co., The. Back Cover
Whitcomb Co., Geo. D. 7
Williams Patent Crusher & Pulv. Co. ... 22
Wilson Machy. Co. 109

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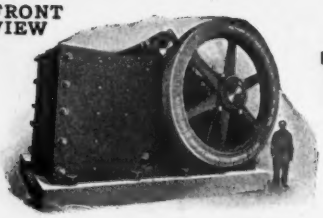
FRONT VIEW



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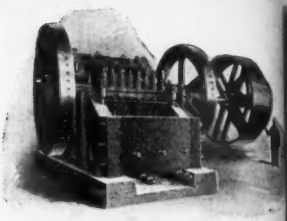
Type "C"

Buchanan
All-Steel
Jaw Crusher



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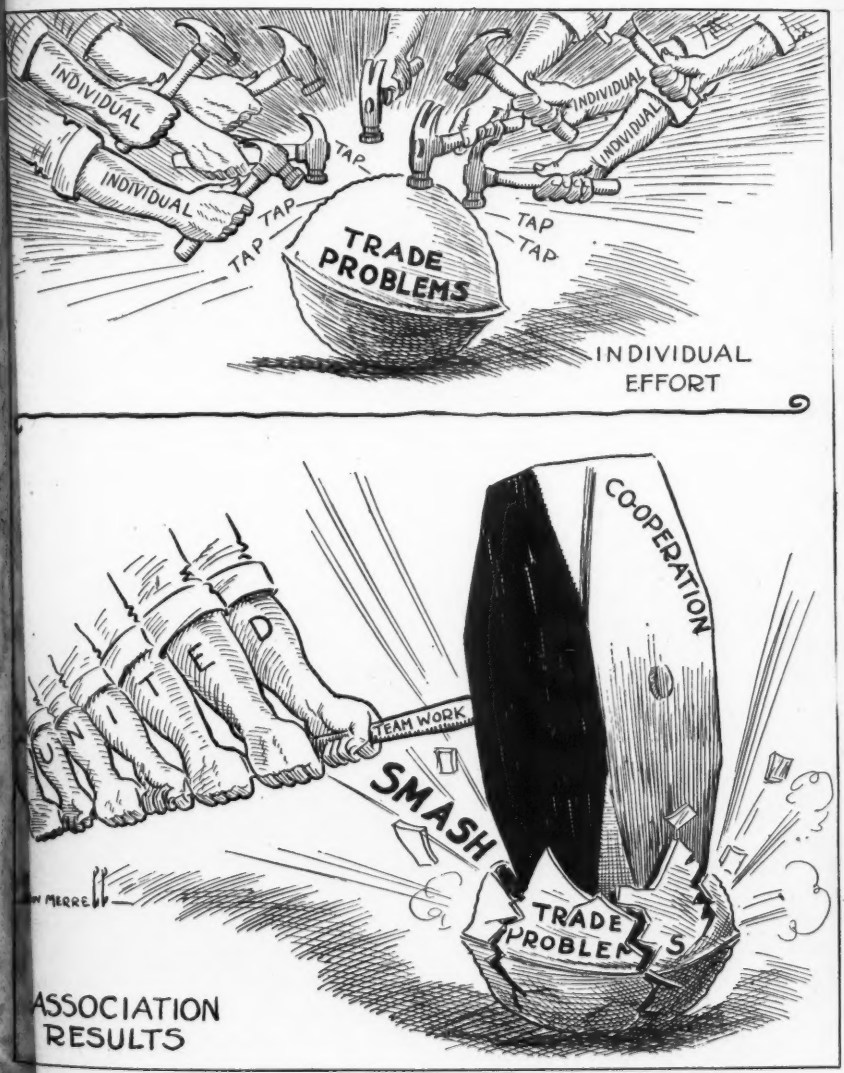

There's one Effective Way to Crack the Nut!

How to Explore a Gravel Pit

By DANIEL J. HAUER

IN ORDER to avoid unnecessary expense and trouble in opening up and developing a gravel pit, installing machinery, etc., it is well to prospect and thoroughly test out the deposit to determine its depth, and the extent of gravel, sand, clay, or other valuable materials that may be hidden. This can be done at a moderate cost if the proper method is used and the prospector goes about it systematically.

On level ground all the exploring must be from the flat surface, but if the country is rolling or the deposit is in a bluff, the strata may be traced along the side of the hills or bluffs, or small tunnels driven into the sides to show up the deposits. However, surface testing usually gives the best results.

A rough plan should first be made of the ground, and some of the topographical features jotted down. This can be made to a scale of 200 or 400 feet to the inch, although if preferred, the measurements may be placed on the original plan. Figure 1 illustrates such a plan, the distinguishing landmarks being the railroad, a property fence, wagon road, and a small stream, which is broken on the drawing to indicate a knoll.

In locating the deposit and determining the depths of the stratum, test holes are made at intervals of 200 to 600 feet on lines which are constructed by means of sighting poles. Lines, A, B, C, and D, on Fig. 1 were constructed in this way. Line A was first constructed, the first three holes being sunk 200 feet apart, and the next 400 feet, in order to locate the deposit and depth of the stratum at the ends to determine to what extent the pit should be developed, and save the expense of stripping a great depth for only a few feet of material. This is true of both ends of the plot as you will note from lines A, B, C, and D. The deposit having been located and the depth of the stratum having been approximated, the test holes were sunk 600 feet apart, as shown on the construction lines. Line B was located 400 feet back of line A, but as the tests showed about the same results, line C was run 800 feet to the rear of B. 800 feet back of line C a test was made, but as no gravel was found, test number 36 was made 300 feet back of line C; then test 36 was made 400 feet back of test 35; and finally test 37 was made 300 feet back of test 36. Line D was then constructed, and as only from 2 to 6 feet of gravel was found by this line of holes, the exploration was not carried farther.

The profile of each line, made from the test hole records, is shown in Figures 2, 3, 4, and 5. These show top soil, a layer of sand, and the deposit of sand and gravel resting on a clay bed.

After locating the deposits by means of these test holes, four pits were sunk down to the gravel deposit at the four locations indicated on the plan. These pits, from 3 to 4 feet square, verified the soundings of the test holes.

Various tools may be used for the sinking of these test holes. A small earth boring auger, similar to a wood auger, is useful and cheap. Small pipes on a drill with a water jet can be used, and even a set of long pipe or solid steel drills. The most satisfactory exploring tool for this purpose is an Erwin dirt auger. This tool was originally meant for digging

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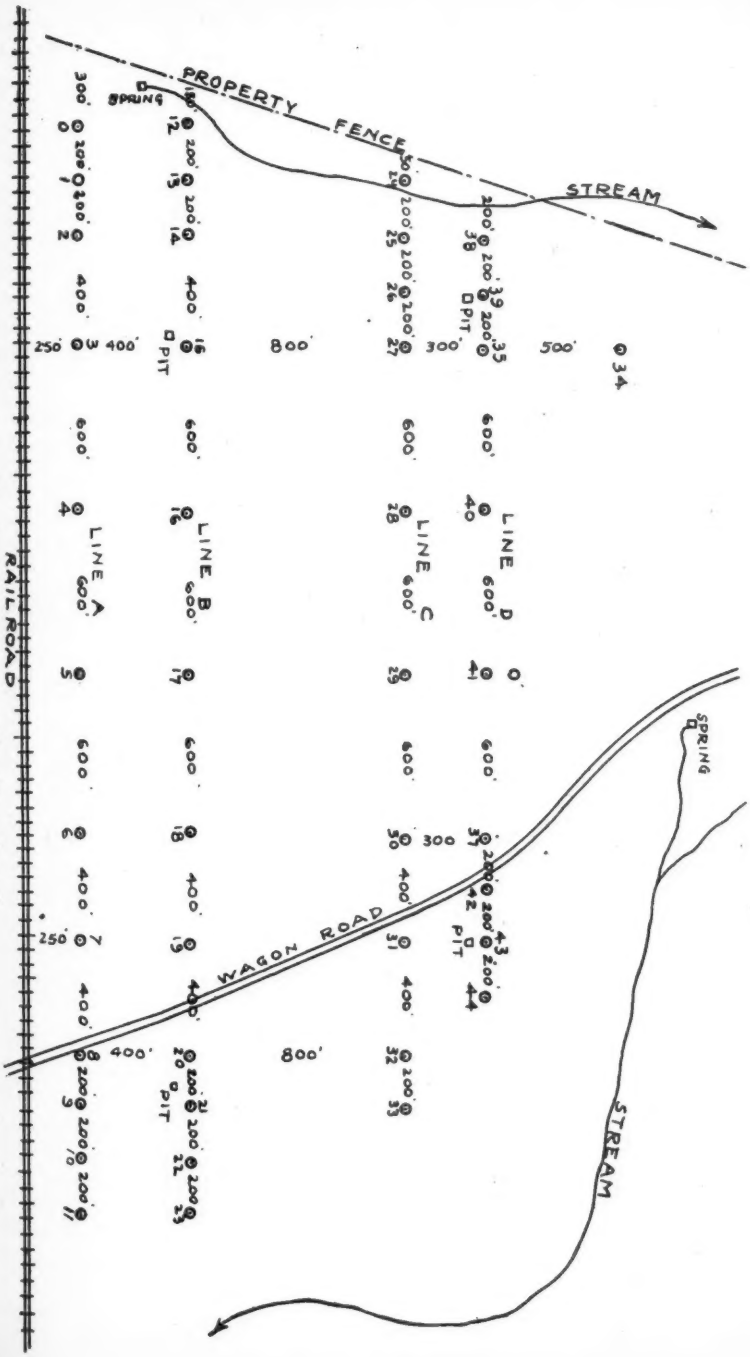


Fig. 1.—Plot showing exploration of a pit.

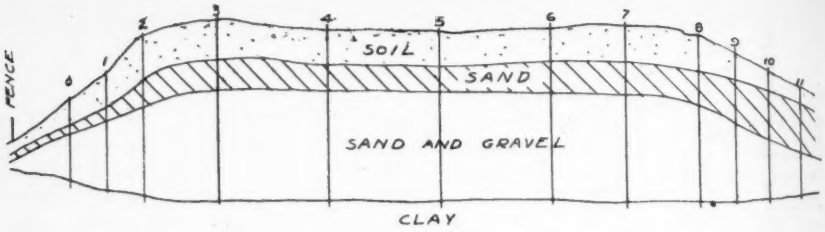


Fig. 2.—Profile on line A.

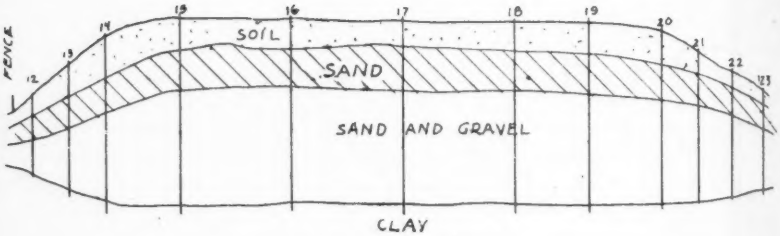


Fig. 3.—Profile on line B.

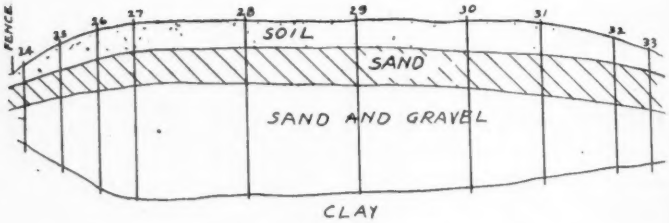


Fig. 4.—Profile on line C.

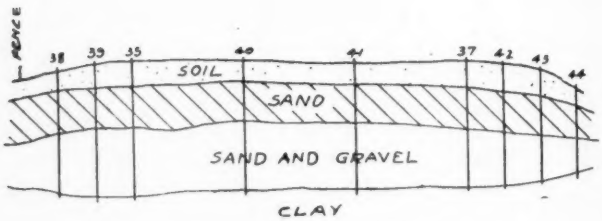


Fig. 5.—Profile on line D.

post holes, but it can be used by means of a long handle and securing lengths of pipe onto the auger to drive holes 50 feet or more in depth. A 6-inch auger of this type will do the work satisfactorily, as it brings up excellent samples of material, and a record can be kept of each hole, showing the kind of material for each foot driven. Figure 6 shows the record of one such test hole from notes taken while exploring.

This is the simplest method of exploring any kind of pit. The auger frequently works hard in gravel, especially if the pebbles are large, but it can be driven through the bed if the test hole is kept wet. For sand and clay little difficulty is experienced. The plot and profiles present a graphic manner of reading the record of the tests, but even if they are not used the test holes and the record made will prove of value and give a fair idea of the extent of the deposit.

Line B—Hole No. 17

0 Surface Clay Soil.
2 ft. Heavy red clay.
5 ft. 10 in. Fine sand.
10 ft. Coarse sand.
19 ft. Coarse sand about 50 per cent gravel.
25 ft. Coarse sand, 60 per cent fine gravel.
28 ft. Coarse sand, 70 per cent coarse gravel.
31 ft. 80 per cent coarse gravel and sand.
49 ft. 3 in. red clay, heavy.
52 ft. Red clay, heavy.

Fig. 6—Record of test hole

Thus the exploration made for this pit showed a deposit 1,500 feet wide and about 3,000 feet long, making a gravel pit of 100 acres. The depth of the gravel shows it to vary from a few feet to 30 feet, so that there are more than 4,000,000 cubic yards of gravel as shown by the tests. This gives some definite information either for a sale or for the installation of machinery and development of the pit.

Sand Man Ready To Meet Emergency

Pennsylvania Producer Tells How He Repaired Roads in France

"I EXPECTED I would be court-martialed, but instead of that I was commended."

This is what C. C. Whiteside, manager of the Rock Point Sand Company, Wampum, Pa., told some of the fellows around the hotel during the Ohio convention, in relating an incident of his experience in France.

Whiteside was in the Engineer Corps, and as he proved proficient in keeping up the roads he was assigned to that work most of the time. And this, after all, was not so much of an engineering problem as it was the exercise of ordinary common sense in the application of rough-and-ready methods.

This particular incident concerned an ammunition train which was being held up by a huge shell hole in the road, around which no pathway could be made for a heavily loaded truck. It was a desperate situation, for the ammunition was badly needed at the front.

The hole was too large to fill in any reasonable length of time; so Whiteside quickly devised the plan of unloading the leading truck and running it into the hole. This was done, and after a little filling to bring it up to a satisfactory level, a road of logs and brush was built over it, and the train was soon on its way.

"And the truck is probably there yet," said the narrator.

The Heil Company, Milwaukee, Wis., is expanding so rapidly that it has found it necessary to establish branches at Wentworth and St. Anthony Avenues, St. Paul, Minn.; Greenwood and Holmes Streets, Detroit, Mich., and 20 East Jackson Boulevard, Chicago.

Some Phases of the Rate Problem

By BEN STONE

Business Director, Illinois Sand and Gravel Producers Association

WE ARE expecting another rate advance, and a great many have already said the industry cannot stand it; but before we undertake to survey the situation confronting us today, I want to take you on a little trip into the not far distant past to see if we cannot discover some of the influences that caused our present affliction to be visited upon us.

It has been only within recent years that the business of producing sand and gravel has developed into an industry of more than local importance. Formerly, each producer's market territory was confined to the nearby station on a railroad that served his plant. It might be said that his freight rate then was an individual affair between himself and the traffic department of the railroad. No other producer was concerned, nor was any other road concerned, except in comparatively few instances where two or more roads reached a common point with sand or gravel traffic; and then more often than otherwise the rate competition was stronger among the carriers than among the producers.

It was not uncommon for producers, with the aid of contractors, to seek special rates in connection with some particular amount of tonnage involved, and such rates were frequently granted by traffic officials, against their better judgment, because of their anxiety to provide traffic for equipment that might otherwise be idle. Almost every producer who was operating prior to the war had certain rates that were regarded by others as being monopolistic.

It might be said that there has never been any well defined basis or principle for making rates on our commodities beyond what it was thought the traffic would bear. Producers have shopped with the carriers persistently, although not at all times consistently, for preferential rates, and the carriers have often shopped among producers, offering specially favorable rates and other inducements to have certain deposits worked. A great variety of arguments were built up in justification of low rates. Then in later years when the roads began trying to get all rates up, it became a game of wits, and many conflicting influences developed.

These past practices have contributed to a most unsatisfactory situation, one very undesirable phase of which is the disposition on the part of carriers to regard sand and gravel business as a sort of tramp traffic, to be handled at will or at their own convenience, and, too often, when they have nothing else to do.

But the principal result, and the one most difficult to overcome, is that there has been built up a structure of rates on sand and gravel wherein, generally speaking, there is no definite relationship of any one rate or group to any other rate or group. In other words, there is no uniformity, and in that respect sand and gravel rates are unlike those on almost any other commodity.

Although we frequently refer to certain relationships as being differentials, I believe I can say without fear of contradiction that there has never been considered, either by shippers or carriers, any definite differential basis in the making of rates on sand and gravel.

The term "differential" in traffic

Mr. Stone reaches a definite and emphatic conclusion in this paper. It is this: That if we are to accomplish anything in our controversies with rate-making bodies, we must have more definite data on the freight situation in our own industry than we have accumulated up to date. At the convention of the Indiana Sand and Gravel Producers Association, where Mr. Stone presented the paper, it made a profound impression. We believe it is along the lines suggested that this problem will have to be worked out.

contemplates a rate relationship, fixed and guaranteed either by custom or a tariff publication.

There are, it is true, at some common points relationships so-called, while they last, as between or among the rates published by individual roads reaching those points; and there are also on some roads more or less definite and recognized relationships as regards traffic moving in the same direction from two or more given points. But there never was any guarantee or understanding that such relationships would not be disturbed, and the general custom followed by practically all carriers in the making of rates and all shippers in the seeking of rates has indicated that there has been no disposition on the part of anyone to respect such relationships as differentials.

When viewed without prejudice the conclusion must be that methods and practices used in negotiations for freight rates have not only served to build up a rate structure that is a masterpiece of cubist art; but that they are responsible in large measure for the present attitude of the carriers as regards the desirability of sand and gravel traffic.

We all know what happened to our rates under General Order No. 28. We also know what happened some months later when the railroad administration proposed to promulgate a schedule of distance rates for our commodities. The former was accepted as a war measure; the latter met with such vigorous protest against the principles involved that it was abandoned.

As the building sason of 1919 advanced, there was set up a great agitation for a reduction of the rates authorized by General Order No. 28, it being universally proclaimed that the sand and gravel industry could not carry such a burden.

The only noticeable result of this widespread agitation was a considerable delay in getting the country's building program started; and with due regard for all that was said at that time about our rates being unduly burdensome, it remains a fact that we have gone through the year and have carried the load without any apparent fatigue.

We are now approaching another operating season. Anticipating another general advance, we are again clamoring for a reduction on the ground that the present rates are too high, and that a further advance would be confiscatory. You may rest assured, however, that the carriers in preparing their application for additional revenue, will not be unmindful of the national agitation last year for lower rates and the seeming ease with which we took that hurdle.

This is not an argument for higher rates—far be it from such. I have repeatedly asserted that I believe present rates are too high. But have we not indicated to the carriers that we do not know how far they may go in the matter of increasing gravel rates

before transgressing the law of diminishing returns? And have they not shown by every act and statement that they do not know, themselves?

I will venture the observation that except for the general understanding that rates authorized by General Order No. 28 were in the nature of a war measure and intended to discourage traffic, predictions of disaster to the industry would have been just as loud among producers as they have been at any time since, and I have a very firm opinion that a general agitation protesting against the anticipated increase, or for a lowering of the present level unless supported by absolute facts, will do more harm than good.

Let us meet this issue squarely. We all know that the railroads must have more money in order to provide the service that will be required. Talking recently with Supt. Bradt of the Illinois Division of Highways, I expressed the opinion that in the final analysis, the production of materials during the next few years would be governed by car supply and transportation service.

I know there is not a man among you who would have the railroad handle his traffic for less than the service is worth, but how many of you know what the service is actually worth, or what your own traffic can afford to pay? How many could say, under oath, that present rates give the carriers full value in return for services rendered Who is there among us that could go before the Commission and state under oath just what would be the effect on his business, on the industry at large, or on any particular group of plants, of an additional 5 or 10 cents per ton on his freight rate?

It is said that ours is one of the foremost of basic industries. So why not get away from the theoretical, speculative and problematical phases of this important factor in our business and by making it a straightforward, clean-cut business proposition, put the sand and gravel industry where it belongs on the transportation map?

To undertake such a step we must first determine what the traffic is now paying; then we may decide whether we can afford to pay more if necessary in consideration for the class of service we know we must have.

We cannot make a true analysis of the situation without immediate, accurate and reliable records, and each producer must furnish such information in respect of his own traffic.

I would respectfully suggest that each of you compile a statement covering all shipments made from each plant during 1919. It must show the points of destination, the distance of each from the billing station, the freight rate to each, total number of cars, total tons, total revenue, average tons per car, total car miles, the per car mile revenue, total ton miles and the per ton mile revenue with respect to each point of destination.

A very simple analysis will show the number of miles your traffic moved; the total number of cars divided into this would show the average car haul. The total revenue, divided by the total car miles, will show the average per car mile revenue, and divided by the total ton miles, will show the average per ton mile revenue. You can then state positively just what measure of revenue your traffic is paying.

An auxiliary statement showing your total plant investment, potential daily car capacity, number of days operated, average number of cars loaded each day, and days lost on account of inadequate car supply and irregular service, would also be of value.

A copy of these statements filed by

each of you with the secretary of your association would enable him to determine what the industry, as represented by your association, is paying. Also what the failure of the railroads to function properly has actually cost. Then, and only then, will you have something to talk about that will command for you a respectful hearing.

It may be that the present rates are unreasonably high—I believe they are; but it has been demonstrated that we can do business under them, and I am sure you will agree that we cannot consistently contend for lower rates under existing conditions until we can make a showing of facts to support our statements. The needs of the industry may require lower rates, for all I know; but in my opinion, the first and foremost need in the matter of freight rates of the industry at large, is a readjustment of the general rate structure, whereby there may be established a comprehensive basis of fixed and guaranteed relationships, not only as regards points of origin and destination on a single line of railroad, but in respect of the traffic handled throughout each distinct market territory. To accomplish this will require collective effort and every one must do his part.

You would then have a stabilized rate structure, under which necessary adjustments and extensions could be had on a showing of necessity, and such adjustments could be handled as individual cases; provided that the general relationships as established would have to be observed and maintained.

In conclusion I would emphasize the suggestion that you prepare a comprehensive and detailed survey of your traffic. You will then have the best ammunition obtainable for meeting any proposal that may be made by the carriers for an increase in your present rate, and it will also serve you well in many other directions.

Should Not Compete for Stone Business

Government Nitrate Plant in Tennessee Should Stick to Original Purpose

A TENNESSEE reader writes the following letter to PIT AND QUARRY, whose point we consider well taken, and with whose contention we are in hearty accord:

There is a bill before Congress—H. R. 10329 and Senate 3390—which vitally affects the stone industry in the states of Indiana, Illinois, Arkansas, Mississippi, Tennessee and Alabama, and in fact throughout the entire South. It provides funds to open and operate a quarry and gives the operating company, all the stock of which is owned by the United States Government, the right to sell this material in the open market.

The main object of this quarry is to provide stone for the manufacture of ammonium nitrate, and we think their sales should be confined to nitrated products, as the chief competitor for these products is the nitrate from Chili; but we do not believe that it is just for the United States Government to go into competition with its taxpayers.

We do not wish to oppose this bill in its entirety, as we believe the nitrate plant at Sheffield will be a wonderful help to the farmers in the South; but we do think the stone industry should register strong objection to the Government going into the crusher business, and believe if the matter is brought to the attention of the Administration that it will be easy to have the bills amended to cover our objections.

The Spruce Pine Sand and Gravel Company, Spruce Pine, Ala., has been incorporated to engage in the mining of sand and gravel. Capital $50,000.

The Wauhatchie Limestone Company, Chattanooga, Tenn., has been incorporated by Alexander Harris, Charles M. Seymour, T. O. McConnell, A. L. Mason and W. T. Kolter. Capital, $100,000.

Pit and Quarry

Rand-McNally Bldg., Chicago, Ill.
Published Monthly

HARRY W. BAUMGARTNER
Publisher
V. E. LARSEN, Manager

E. S. HANSON, Editor
D. J. HAUER, Associate Editor

THE early delivery of highway materials, and payment for them when accepted, is the logical method of facilitating the road building program. But this requires the early making of appropriations, the early letting of contracts—in fact a little more forward looking all along the line. If the laws of your state do not seem to allow payment for materials, in advance of their use, then the change of such laws is a good objective to work for.

CAPACITY is a good thing to have in times of car shortage. We said *capacity*—mind you—not *output*. For when cars are being apportioned, the capacity of a plant is the governing factor. There are plants which are insuring themselves against the time of need by deliberately building beyond any expected demand. And they consider it reasonably cheap insurance at that.

CONTRACTS for railroad ballast usually have to be taken at a very low figure. To compensate for this, the producer should claim the privilege of making deliveries at his own convenience. Some of them will not take ballast contracts on any other terms. And we are inclined to believe they are right about it.

Meeting Conditions

SOME engineers are sufficiently broad-minded and adaptable to fit their specifications to conditions while others are not. The case came to light recently of a county engineer who drew up specifications for a number of miles of road work—specifications which were all right in themselves, but under which it would be necessary to haul the materials a hundred miles or more, while sufficiently good materials, if properly combined, were close at hand.

Fortunately the engineer was the type of man willing to acknowledge a mistake when it was pointed out to him, and the specifications were changed, much to the gratification of the local producers, and to the economic gain of the taxpayers of the county. But it might easily have happened otherwise.

Suppose for the sake of argument that the resultant road was not quite as good as it might have been under the original specifications. This does not prove that they should not have been changed. To arrive at any determination on this point, it would be necessary to take all factors into consideration, balancing the supposed increase in strength against the known increased cost, as well as giving due weight to the traffic needs of the county, the ability and willingness of the taxpayers to supply the money, and other factors which determine such expenditures.

Considerations of economy — of selecting to fit the available funds—apply in road building as in everything else. Everybody's wife might look better in a sealskin coat, and certainly such a garment would be more serviceable than such as she usually wears; but the fact remains that for the most part she does not wear sealskin, nor will she until there is a considerable readjustment of values.

And so the problem of the highway

engineer, as so well pointed out by Mr. H. K. Bishop, state highway engineer of Indiana, before the recent sand and gravel convention of that state, is not to devise an ideal highway, but to design the best possible system for the amount of money either actually or potentially available. Mr. Bishop pointed out that a material at a dollar a ton might be well recognized as superior to one at sixty-five cents; but this does not necessarily mean that the one at the higher rate must be accepted.

A more general acceptance of these principles—a more general disposition to create the specifications to get the best road with the materials economically available—will do much toward speeding up the road building program.

IT IS TO be hoped that the Indiana decision, practically nullifying the effect of the lien law and taking away the protection of such a law from the men who supply building materials for construction work, may not be taken as a precedent for other states to follow. But it is worth remembering that a court decision, however much it may pervert a law from its original purpose, has no power to prevent the revision of the law so that it will accomplish its end. Such a condition as exists in Indiana is sure to be a trouble-maker and should be allowed to exist only until remedial legislation can be put through.

THE proposition now being presented to state sand and gravel associations, to take out membership in the national association as a body, is worthy of serious consideration and definite affirmative action. It has been shown conclusively that there is a real work to the country-wide organization, and there should be no hesitancy about giving it adequate support.

The Wisconsin Idea

UP IN Wisconsin they are never averse to doing things a little bit different. The Wisconsin people are not bound by precedent or custom. If a line of action looks good to them, they are perfectly willing to be the pioneers.

That's probably the reason they have a "mineral aggregate" association, instead of various organizations devoted each to a different material.

Let us call it the "Wisconsin Idea."

Permit us to say, too, that in many respects it looks good to us, and we shall not feel that the Millennium is any farther away if some of the other states should decide to adopt it also.

The matter of freight rates, at least, could be handled better by a joint organization. For all aggregates look alike to the railroads, and a united demand would have more weight with them.

That is just one reason. There are others.

Keep in mind the "Wisconsin Idea."

GRAVEL and stone have their place in the poultry business, to be sure. If a chicken is not supplied with teeth by nature, some other means for reducing its food to digestible form has to be provided. But when it comes to loading a chicken with more of these materials than its gizzard really demands, just to increase the weight, that is scarcely fair to the ultimate consumer. Besides, it surely must be rank profiteering to buy pit and quarry products at two or three dollars a ton, and sell them as fancy dressed poultry at 37 cents a pound.

The Newport Crushed Stone Company, Wilmington, Del., has been incorporated by M. M. Lucey, M. Butler and L. S. Dorsey, to own and operate stone quarries. Capital $50,000.

ASSOCIATION ACTIVITIES

All Illinois Now United

Chicago and "Down State" Producers Have Merged Their Interests in One Association

THE banquet of the Illinois producers of sand and gravel on January 14 apparently turned into a love feast. At any rate at their meetings on the two following days the two organizations—one for Chicago and one for "down state"—merged into one, adopted a common constitution, laid aside all differences if any existed, and elected a set of officers representative of the whole industry.

It was a delicate job which was imposed upon the nominating committee, and its instructions were to report two complete tickets. But in the case of the president the instructions were disregarded and the former head of the state association placed on the ticket alone. The list is as follows:

President—M. D. Schaff, Virginia Timber Co., Springfield.

Vice-president—G. P. Longwell, Consumers Co., Chicago.

Treasurer—Burton H. Atwood, Interstate Sand & Gravel Co., Chicago.

Secretary—Ben Stone, Springfield.

The executive committee, in addition to the president, is composed of the following: H. D. Conkey, Mendota; V. O. Johnston, Lincoln; F. E. Lane, Chicago; R. E. Thomas, Chicago.

The Springfield office has been closed and all business will be handled from the Chicago office in the City Hall Square building.

Forty-one members are now included in the organization, taking in, beside the down-state companies, all the producers in the Chicago district except one.

Liability insurance and its relation to the gravel industry was presented very ably in an address by Mr. P. B. Carey, of the Illinois Industrial Commission, and a comprehensive discussion of the subject was led by Mr. George Hickox, of the Joliet Gravel Co., a newly elected member of the association. Mr. Hickox is primarily an insurance man, being attorney-in-fact for the Illinois Mine Operators Indemnity Exchange. The discussion, under his leadership, developed that the gravel industry has been paying premiums out of all proportion to the risk involved. A resolution was passed instructing the secretary to collect information that will enable the association to determine what may be done in this matter.

Planning Publicity Campaign

Lime Association Spends Two Days at Pittsburgh in This Work

THE executive committee of the National Lime Association spent two days in conference in Pittsburgh about the middle of January.

The time was devoted principally to the discussion of plans for publicity work, each department head presenting plans for his own department.

As a result, a large number of booklets will be prepared and given wide circulation.

Stone Program Taking Shape

Big Highway and Transportation Men Will Be Present and Take Part

WHEN last seen, shortly before going to press, Secretary A. P. Sandles, of the National Crushed Stone Association, was busily engaged in rounding up speakers and making final arrangements for the National Convention in Louisville, February 9, 10 and 11.

"You can write it down and sign your name to it," said Mr. Sandles, "that the year of 1920 will be the best quarry year ever experienced in the stone industry, and an outlook such as this is developing a wide-spread interest in our convention and will bring a big crowd to Louisville. A dozen or more states have already signified their intention of sending delegates from their highway departments, and a number of these men will take part in the program. Notable among these will be Mr. G. P. Coleman, highway commissioner of Virginia, and president of the American Road Builders Association, which will hold its convention in Louisville the same week. These men will no doubt have considerable to say about specifications, and their talks should develop much discussion from the floor.

"Of course, the outstanding topic of discussion during the sessions will be that of the railroad situation, including rates, the distribution of cars, and other related subjects. Hon. Robert W. Wooley, Interstate Commerce Commissioner, Washington, D. C., will be present, devoting his address principally to the subject of freight rates. Inasmuch as the Interstate Commerce Commission is expected to have much greater power over rates after the first of March than has been the case for some time past, the stone industry will take much interest in what Mr. Wooley has to say.

"Another speaker on this important question will be the Hon. A. G. Guthein of the Car Service Section, U. S. Railroad Administration, who has made no definite promise as to the ground he will cover, more than that he will discuss transportation topics generally. He is the man who has shown a disposition to assist the stone industry so far as possible and will probably be even more friendly disposed after meeting the producers at Louisville and finding out some of their problems."

A. P. SANDLES,
Who Predicts a Successful Convention at Louisville

The National Association has recently sent out a questionnaire on the rate of wages per hour being paid the various classes of labor, and it is expected that a tabulation can be made of these replies in time for presentation and discussion at Louisville.

Convention headquarters will be at the Seelbach Hotel, the meeting room being on the tenth floor. The local arrangements are in charge of Colonel R. B. Tyler, whose headquarters will be in Room 5 on that floor.

It's Worth While To Work Together

Ohio Producers Well Satisfied That Cooperation Is the Proper Thing

PAST President Coppock of the Ohio Sand and Gravel Producers Association, standing on the side lines at the Columbus convention the other day, remarked that ninety per cent of the plants have gone through a period of insolvency at one time or another. And they would be in little better condition now, he said, but for the work in the betterment of the industry which the various organizations have done. And yet there are some producers who still remain on the outside, getting much of the benefit of the work done, but not taking part in it in any way.

This was not stated in open convention, you understand, but is one of the matters on which Mr. Coppock feels very strongly and is undoubtedly what he would have said if he had not been so modest as to ignore entirely the fact that the program listed him for an opening talk on "Association Pep." It is the thing he believes in profoundly, but he prefers to talk it less formally than from a rostrum.

He was past president at the time he was discussing the matter, too; for the nominating committee acceeded to his request to be relieved from active service, and R. E. Dobille of Toledo was then in the chair.

This all happened at Hotel Deshler in Columbus, Jan. 20 and 21, and here are the names of the new officers:

President—Richard E. DoVille, Toledo.

Vice-president—F. E. Hall, Cincinnati.

Secretary-treasurer—F. C. Fuller.

Executive Committee—E. A. Evans, Zanesville; Frank Tejan, Dayton; Harry Donnelly, Cincinnati; F. D. Coppock, Greenville; Herbert K. Gill, Columbus.

F. D. COPPOCK,
Retiring President

In presenting the new ticket, Harry Donnelly, chairman of the nominating committee, made a few remarks, which came very near getting lost in the shuffle, to the effect that the committee had taken into account certain insinuations that the association was too much of a "bank" proposition, and so had placed in nomination men representing the three classes of producers in the state—bank, lake and river.

So the personnel of the elective administration underwent a considerable change; but the new executive committee promptly chose the efficient executive secretary, Guy C. Baker of Greenville, to succeed himself, proving conclusively that there was no hint of faction in the change, and that the affairs of the association will continue along in their accustomed well ordered way.

E. S. Warner, of Akron, was not reelected to the office of secretary-treasurer, it should be stated, because of the fact that the automobile accessories business, for which Akron is famous, has lured him away from sand and gravel production.

"Cooperation," as suggested by Mr. Coppock's remarks, was the keynote of the whole convention, so that it was very fitting that the program of addresses should begin with a paper on this subject. The man chosen to frame up the collective thought into word form was C. M. Ault, of the Barnes Sand and Gravel Company, Piketon, Ohio. He developed his topic from a number of different standpoints, all valuable and some of them rather novel, closing with the timely suggestion of cooperation in helping fellow producers to fill orders when their plants are either overloaded or compelled to shut down.

The early part of the first afternoon, preceding an early adjournment to allow some of the members to attend other related conventions in progress on the same day, was considered by Secretary Baker, who was presiding, the "opportune time" spoken of in the following notice which appeared on the last page of the program:

PROGRAM

Wednesday, January 21, 1920

10:00 A. M.

Report of Nominating Committee.
Election of Officers.
"A Little Chat from an Engineer," by Mr. Bookwalter, county engineer, Montgomery County.
"Closer Relationship between Contractors and Producers," by C. H. Duncan, secretary Contractors Association of Ohio.
"Freight Rates and Car Supply," by E. Guy Sutton, secretary National Association, Indianapolis, Ind.

Luncheon

12:30 P. M.

"Use of Gravel for the Maintenance of Roads," by Perry, chief deputy Highway Maintenance, Columbus, Ohio.
"Tests of Ohio Sand and Gravel and Its Uses in Concrete Construction," by A. E. Rae, engineer of tests, Ohio State Highway Department.
Discussion led by Clinton Cowen, former State Highway Commissioner of Ohio.

R. E. DOVILLE,
President for 1920

The speakers were given their cues by Mr. Baker in his introductions, and managed to combine sense and nonsense in just about the right proportions. Mr. Tijan brought out one valuable point as bearing on the association idea, which is that the banker (the real financial variety, not the sand bank manipulator) is likely to ask the man who seeks credit whether or not he belongs to his trade association, and to look with more favor, other things being equal, on those who hold such membership.

The election of officers opened the proceedings of the second day, which did not open on schedule time by any means, as many of the delegates had been in attendance at the big road builders' banquet the night before or elsewhere.

Then was introduced A. N. Johnson, highway engineer for the Portland Cement Association. Mr. Johnson took occasion in the first place to commend the work which Secretary E. Guy Sutton of the National Association is doing at Washington, the speaker saying that he has had occasion to know intimately of this work and that Mr. Sutton has the confidence of the Railroad Administration in a marked degree.

Mr. Johnson then gave a brief description of the "fineness modulus" for proportioning concrete aggregates as developed by Prof. Duff A. Abrams of Lewis Institute, Chicago, and which when reduced to workable terms is to have such a far-reaching effect in fitting the specifications to the materials, rather than insisting than one set of standard specifications be applied everywhere, irrespective of local conditions.

This means that the producer will be able to dispose of practically all of his materials, the proportioning being so regulated as to suit the supply at hand and at the same time get the requisite quality of product.

County Engineer Bookwalter of Montgomery county, gave "A Little Chat from an Engineer," and C. H. Duncan, secretary of the Contractors Association of Ohio, talked on "Closer Relationship Between Contractors and Producers."

The association ate luncheon in a body on both days, on the second day listening at that hour to addresses by two engineers of the State Highway Commission.

E. H. Lyons, president of the Standard Lime and Stone Co., Fond du Lac, Wis., dropped dead in his quarry a few days ago.

The Pioneer Sand & Gravel Company, Seattle, Wash., will expend $40,000 in the construction of a frame wharf and bunkers.

Slag Producers Elect Officers

Most of Tonnage Represented—Plans for Popularizing This Product

APPROXIMATELY 90 per cent of the tonnage of commercialized blast furnace slag was represented at the annual meeting of the National Slag Association, held at the office of that organization, 933 Leader Building, Cleveland, Ohio, January 16th.

The result of the election of officers for the year 1920 follows:

L. A. Beeghley, Standard Slag Co., Youngstown, Ohio, president.

C. E. Ireland, Birmingham Slag Co., Birmingham, Ala., vice-president.

H. J. Love, secretary-treasurer.

The executive committee will consist of the following: President L. A. Beeghley, Standard Slag Co., Youngstown, Ohio; E. H. Kuttner, Illinois Improvement & Construction Company, Chicago, Ill.; F. A. Sarstedt, Cleveland Macadam Co., Cleveland, Ohio; L. H. Hawblitz, France Slag Co., Toledo, Ohio; H. N. Snyder, Buffalo Slag Co., Buffalo, N. Y.; C. L. McKenzie, Duquesne Slag Prod. Co., Pittsburgh, Pa.

Organization plans to enlarge the scope of the work of the Association were completed that will enhance the value of the technical and practical side of the material along the lines of diversified uses which have been advocated by the producers.

The object of the organization is to bring recognition to this material as a standardized concrete aggregate in all classes of construction, a superior macadamizing agent, and a satisfactory railway ballast.

Great Is Macadam

Ohio Sons Pay Their Annual Tribute to the God of Good Roads

THE actual count by the hotel steward or somebody, showed 455 people present at the annual banquet of the Ohio Macadam Association. This was held at the Hotel Deshler, in Columbus, January 13.

Any inquirer who wants to know who all these people were, where they came from and how they got there, is referred to Secretary Sandles; but Sandles can be a sphinx on occasion.

At any rate they all had a good time and are hoping that they will have a chance at the next one in 1921.

The first part of the program, denominated "The Feed," was as follows:

Olives Almonds Celery
Cream of Tomato Soup
Roast Spring Chicken
Au Gratin Potatoes French String Beans
Hearts of Lettuce,
Thousand Island Dressing
Biscuit Tortoni, Petit-fours
Demi-tasse Cigars

Then Sandles duplicated his performance of a year ago, by putting a bunch of about a dozen speakers through their paces in such a way as to hold the interest of all to the last. The speakers and their subjects were:

"The Old World and the New"—Hon. Wm. G. Sharp, ex-ambassador to France.
"The Call to Colors" — Lieutenant Colonel Ralph D. Cole.
"A 33d Degree 'Good Roadster' "—Hon. A. R. Taylor, state highway commissioner of Ohio.
"Watchman, What of the Night?"—Hon. John G. Price, attorney general.
"The Rainbow Comes Down in Ohio" —Ex-Governor James E. Campbell.
"Lifting Common Folks Out of Mud and Mire"—Hon. Franklin P. Riegle.
"A Square Deal for Rural Ohio"—Hon. L. J. Taber, master Ohio State Grange.
"Old Glory vs. the Red Rag Flag"—Hon. Hugh L. Nichols, chief justice of Ohio.
"Meat in the Smoke House and 'Taters in the Cellar"—Hon. Myers Y. Cooper, president Ohio Fair Boys.
"The Good Old Days Are Coming—Not Gone"—Hon. John Henry Newman, state librarian.

Holland Lime Producers Visit U. S.

Making Study of Modern Manufacturing Methods as Used in This Country

A REPRESENTATION of the Dutch Lime Manufacturers' Association, in the persons of Messrs. H. C. M. Dolk, I. W. O. Clant, and P. F. van der Wallen, of Leiden, Holland, recently visited this country to secure information relative to the uses and applications of burnt lime products as developed in the United States. They made a special study of modern methods of manufacturing and handling lime, with a view of improving the Dutch lime industry so that it may be better prepared to meet the problems presented by the present reconstruction period.

The commission put itself in touch with the staff of the National Lime Association, through which an itinerary was arranged that enabled them to visit several of the most up-to-date plants in this country and to examine various types of kilns, hydrators, automatic handling devices and other means of modern lime production and distribution.

The visit of this commission is indicative of the aggressive co-operation of the Dutch Lime Manufacturers, and their tour of inspection was much facilitated by our own National Lime Association.

The Wilmington Crushed Limestone Company is beginning the erection of a large stone crushing plant on a tract of land at Melvin, Clinton County, on the Pennsylvania and Baltimore and Ohio Railroads. Mr. H. T. Stinson of the Queen City Gravel Company, Cincinnati, Ohio, is manager, and H. S. Anderson, formerly erecting engineer for the Allis Chalmers Company, Milwaukee, Wis., will superintend the building and operation of the new plant.

May Last Three Days

Sand and Gravel Men Will Allow Almost Unlimited Discussion at National Convention

WHILE the National Association of Sand and Gravel Producers has scheduled its convention for February 11 and 12, there is a possibility that it will continue over for another day.

There is a general feeling in the executive committee that a third day could be spent to good advantage, considering the fact that many topics are coming up which the members will want to discuss at considerable length.

Blanks are now being sent out to the members, asking them to send in questions on which they would like information. Provision is made for questions under two classes — first, topics which may be discussed from the convention floor; second, topics on which the questioner would like to have information from one or more operators privately. As these questions come up they will be carefully scheduled by the committee and a place will be hade on the program for such as are for public consideration, while an effort will be made on questions of the other class to get the inquirer in touch with some other member who can give him definite information. This is a feature of the program which is expected to be productive of very satisfactory results.

One of the notable speakers on the program will be T. R. Agg, professor of highway engineering at Iowa State College, Ames, Iowa. His topic will be "Standard Sizing for Sand and Gravel." Professor Agg is chairman of a committee on this subject in the American Society for Testing Materials, and also chairman of the same committee in the Mississippi Valley Highway Association. The discussion of this topic will be led by J. C. Buckbee of the Northern Gravel Company, West Bend, Wis.

W. K. Hatt, professor of civil engineering at Purdue University, will talk on the subject of "Tests of Sand and Gravel Concrete," giving the result of tests which have been made in the university laboratory at Lafayette, Ind. The discussion will be led by R. C. Yeoman, the association engineer. "The Pumping of Sand and Gravel" is a topic which will be taken up by several different producers, led by R. Snoddy of the Coon River Sand Company, Des Moines, Iowa.

The present industrial unrest makes very timely a discussion on industrial relations, including data and experiences in profit-sharing and bonus plans, and other methods of increasing the efficiency and stability of labor. F. D. Coppock of the Greenville Gravel Company, Greenville, Ohio, will lead the discussion on this subject. A. G. Gutheim of the car service section, U. S. Railway Administration, will be the speaker on "Transportation Problems." He will devote himself principally to matters of car service.

H. S. Earle of the Genesee Gravel Company, Detroit, Mich., who has a national reputation as "Good Roads" Earle, will talk on "Concrete Roads Yesterday and Today."

Iowa Association

THE Iowa Sand and Gravel Producers Association will hold its fourth annual convention at the new Savery Hotel, Des Moines, Iowa, February 4th and 5th.

An unusually interesting program has been planned, and various topics of both local and national importance will be taken up and discussed from different viewpoints.

Several men prominent in the industry will be present and have promised to speak on different questions which are of vital importance to sand and gravel producers.

Joins National In A Body

Indiana Sand and Gravel Producers Take This Action at Recent Convention

THE most important action taken by the Indiana Sand and Gravel Producers Association at its annual convention in Indianapolis January 6 and 7, was perhaps the decision to join the National Association as a body. This was done under the provision of the constitution of the National Association whereby members of a state association may become members of the National by the payment of 75 per cent of the assessable dues against individual members. The rate of assessment of the Indiana Association was increased 20 per cent in order to provide funds to carry out the provisions of this resolution, making the present dues as follows:

Six mills per ton for the first 100,000 tons of commercial gravel and sand sold outside of the Chicago switching district. Two mills per ton for all commercial gravel and sand in excess of 100,000 tons sold outside the Chicago switching district, one mill per ton for all commercial gravel and sand sold in the Chicago switching district. One mill per ton for all railroad ballast sold.

The Association also put itself on record as favoring the inclusion of the anti-strike and compulsory arbitration clause of the Cummins Bill, and voted to send a copy of this resolution to each of the Indiana senators and representatives in Congress and to the members of the committees on Interstate Commerce.

A resolution was also passed calling for a proper amendment to be prepared to the state lien law, and introduced for passage at the next legislature. This was done because of recent decisions in Indiana tending to make of no effect liens for materials used in construction where contracts between owner and contractor provide that no lien shall apply. These decisions and their effect were reviewed at some length before one of the convention sessions by Mr. Earl R. Conder, an Indiana attorney.

The program of the convention was altogether instructive and gratifying from first to last, proving conclusively that this first of the state associations to be organized is losing none of its old-time interest.

Mr. M. A. Neville, vice-president, who was scheduled to preside in the absence of President Huffstetter in Florida, was also unavoidably absent, and it devolved upon George V. Miller of Indianapolis to act as moderator throughout the sessions. Mr. Huffstetter did not neglect the association, however, even in his absence, but sent a long and carefully written letter from his temporary home in Florida, discussing not so much matters pertaining to sand and gravel as to some other things which were uppermost in his mind. He evidently felt that sand and gravel men could profit by a little sermon about Christmas time—which was when the letter was written—and as coming from a layman, it was an ideal sermon indeed.

Secretary Sutton presented a paper on Association activities, reviewing some of the past work which has been done and outlining some of the plans for the future. Among other things he said:

All indications point to the fact that the car situation will not be any better this year. On account of the recent miners' strike there will be no stocks of coal on hand in the spring. Profiting by past experience, fuel for home consumption will be purchased and transported during the summer months. The demand for coal for manufacturing purposes promises to be extremely large, which means an increased demand for fuel used for transportation purposes. While the railroads will be turned back to the owners on March 1st, yet this fact will not increase the car supply, either actually or relatively.

There is little doubt but that the distribution of cars will continue to be delegated to some sort of centralized control, which means that the best results will be attained by handling the question as an industry as will our chief competitors for cars—the coal operators. If our business is to survive and prosper, we must not consent to be further penalized in the matter of car supply, so that here is another place where we must be most active.

The Indiana Association from the time of its organization has held to the view that the question of freight rates should be left in the hands of the individual producer. Under federal control we suffered an average increase of over 50 per cent, while other commodities bore only 25 per cent. We now face the probability of another general advance. Already because of the excessive freight rates applying on sand and gravel, the situation being aggravated by the limited car supply, temporary plants have sprung up in large numbers in other states, and no doubt Indiana will eventually have her full share of side-of-the-road plants, since the machinery dealers supplemented by the Portland Cement Association are strongly advocating the establishment of these makeshift facilities. Under the menace of our business being seriously curtailed because of the fact that high freights limit the territory and invite the sort of competition referred to, does the Association still believe that the question of freight rates should be considered as purely a local matter and approached as such? In my opinion we can only combat this pending danger by presenting a united front and before this convention adjourns I hope to see a plan fully determined upon for attacking this momentous and imminent problem.

Very careful consideration was given to the paper by Mr. Ben Stone, secretary of the Illinois Sand and Gravel Producers Association, on the topic of freight rates. This paper is given almost in full in another part of this issue.

Mr. R. C. Yeoman, after giving a short resume of his activities for the past ten months, introduced the latest copy of the State Highway Commission specification, describing gravel for use in concrete roads. This specification was vigorously criticized by Mr. Owen and briefly discussed by others. Whereas the Highway Commission specification allows a tolerance of only 5 per cent of fine material in the grading of the coarse aggregate and believe this to be an uneconomical refinement; a resolution was passed asking the engineer to promote and urge a tolerance of 15 per cent, passing a ¼-inch screen.

Dr. W. K. Hatt and his able assistant, Mr. Crepps, presented the results of the Purdue tests of sand and gravel for concrete road making. He left no doubt as to the good quality of the Indiana materials for this purpose. He taught the scientific meaning of sizing and grading in a manner that made it both simple and clear to those who are not technically trained. He showed that the results of the tests compared favorably with those of other investigators, thus proving the uniformity and the quality of workmanship at Purdue University.

Mr. Kellam, testing engineer of the State Highway Commission, added valuable comment during the discussion and answered many questions. Samples of test specimens were on exhibition and explained by Mr. Yeoman. The results clearly demonstrate the interest of the Association in this line of investigation and the need for further work.

The following are the officers elected for the year:

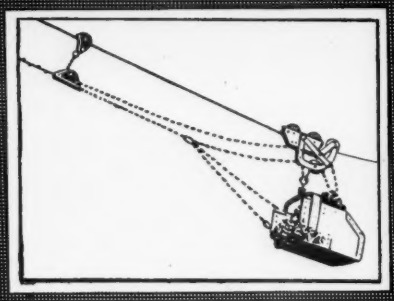
President—H. C. Huffstetter, Indianapolis.

Vice-president—G. J. Nattkemper, Terre Haute.

Treasurer—W. P. Carmichael, Williamsport.

Executive Committee—District 3, M. A. Neville; District 4, H. K. Morgan; District 5, W. S. Baird.

Annual Banquet of Indiana Sand and Gravel Producers' Association.



SAU

DRAGLINE C

Getting Ready for Bigge Yea

The road-builders say they may require more grav incr this year than the sand and gravel plants of th en ab country can produce. ent w me.

But the sand and gravel producers reply that the will be prepared to meet the demand, and certainl many of them are getting ready in the right way. ever ise fo

They are getting ready by installing Sauerman drag line cableway excavators, either for increasing th capacity of their old plants or for opening up ne pits. f you be ou

So it is a certainty that Sauerman dragline cableway excavators—the machines that conserve labor an equipment expense by combining digging, convey ing, elevating, and dumping in one operation—wi play a big part in making 1920 a record year in th production of sand and gravel in the United State

SAUERMAN BROS., 31

ERMAN

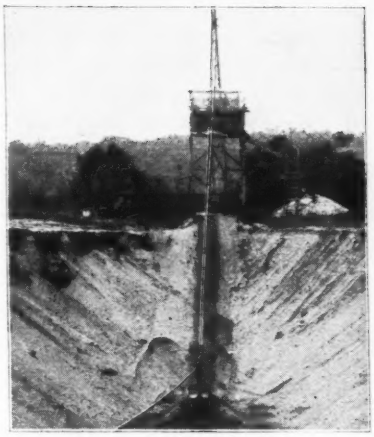
E CABLEWAY EXCAVATORS

Bigge Year in Gravel Industry

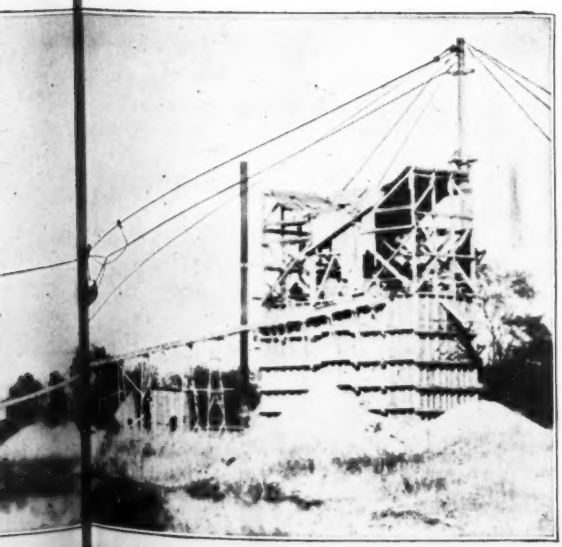
mote grave increasing our manufacturing facilities, we have dants of th en able to take care of all orders for our equip- nt with reasonable promptness up to the present me.

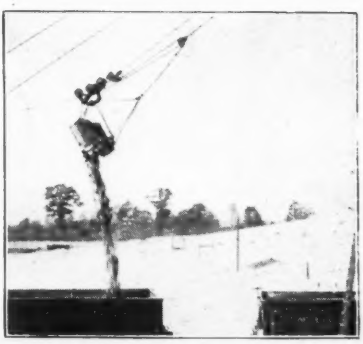
ly that the nd certain wever, at this season of the year, it is always ight way. ge for the prospective purchaser of gravel plant erman drag uipment to place his order as early as possible and creasing th ch is particularly true this year.

ning up ne f you are planning to open a new pit or to increase e output from your present pit, we shall be ine cablewa essed to have one of our engineers talk over your e labor an blem with you. Possibly you are planning to ing, convey tend the convention of the National Sand and eration—wi ravel Producers' Association in Chicago, February l year in th and 12, which would be a fine opportunity to get nited State gether on your proposition.



S., 31 S. Dearborn St., Chicago





District Meeting at Kansas City

Producers Discuss All Sorts of Topics Pertaining to the Trade

A MEETING of the 13th District Association of Mineral Aggregate Producers, including the sand, gravel and crushed stone producers of Nebraska, Kansas, Missouri and Oklahoma, was held in Kansas City on January 19 and 20 at the Hotel Baltimore. Twenty-seven representatives were present at the several sessions.

Mr. John Prince, president of the Stewart Sand Company, presided at the meetings, and F. A. Laughead, secretary of the Missouri Valley Association of Sand and Gravel Producers, acted as secretary.

The committee on arrangements consisted of Frank Peck, chairman, Muncie Sand Co.; Duke Stewart, Stewart Sand Co.; Fred Johnson, Prince-Johnson Limestone Co., and W. M. Spencer of Independence, Mo.

The Monday morning session was devoted to a discussion of the past year's business by the producers from the different parts of the district. Uniformly the producers reported the principal difficulty was that of securing railroad equipment and the movement of their product. Practically every producer present experienced this difficulty. From the reports of the various producers, it developed that the average price received by the producers in Oklahoma, Kansas and Missouri for the past year amounted to 60 cents a ton on sand. Part of the producers in Nebraska received from 60 to 80 cents a ton, while in the eastern part of the state the price was 35 cents per ton. The Oklahoma sand producers stated they had made some contracts for the current year at 70 cents per ton. Some contracts for this year were reported for Missouri and Kansas at 75 cents a ton, less a cash discount, and 40 cents a ton has been quoted in eastern Nebraska. The prices reported for the past year in crushed stone production vary from $1.50 to $2.00 per ton, the first price prevailing in the eastern part of Nebraska.

The afternoon session was devoted to a discussion of the railroad situation, Mr. E. Guy Sutton, secretary of the National Association of Sand and Gravel Producers, leading the discussion. It developed the probability that the railroads would continue under national control through the Interstate Commerce Commission, insofar, at least, as the car service section is concerned. This made very evident the need of a national association, both in sand and crushed stone, to continue to deal with the railroad situation.

The Tuesday morning session was devoted to association work. Mr. Sutton led the discussion concerning the value of the national association, and Mr. Prince led the discussion on the value of the local association. The discussion became general, and in this it developed that much of the value of the local association work came from uniform cost reporting and an exchange of cost information.

It became evident that many items of cost, such as depreciation, exhaustion, insurance on floating equipment, etc., are not now covered by the majority of the producers, their cost therefore being incorrect and their apparent profits being misleading. It developed that the Missouri Valley Association, including Kansas and Missouri, is now preparing to secure this cost data and assist producers in arriving at a satisfactory determination on the intangible costs referred to.

The formation of a bureau for carrying the marine and fire hazard on the floating equipment in the district was discussed, and a further report

on this subject will be had. The experience in the district indicates that this hazard amounts to from 15 to 25 per cent per annum on the value of the floating equipment used in the district. Mr. Laughead, secretary of the local association, is securing data from the district over a sufficient length of time to establish the annual charge to be made on account of the hazards mentioned.

Tuesday afternoon was devoted to going over the several sand and crushed stone producing plants in Kansas City.

During the two days the 13th District provided the entertainment, which consisted of luncheons Monday and Tuesday at the Baltimore Hotel, dinner Monday night, at which the ladies were invited and a theater party Monday night, also including the ladies.

Dallas Producers Can't Fill Orders

Labor Shortage Gives Industry Large Degree of Uncertainty

INCREASING activity is reported in the sand, gravel and crushed rock industry in all parts of Texas, especially in Dallas and Fort Worth, where unprecedented building operations are now under way. Building operations were held up for a time by bad weather, and impassable roads due to excessive rainfall and heavy traffic caused a practical standstill in road work. But several weeks of favorable weather has greatly improved roads and has enabled all building operations to go forward. The result is that demand for gravel and sand for building operations and crushed rock for road work and street improvement is greater now than ever before.

The one deterrent factor, gravel men report, is the labor shortage. Such help as they are able to employ demand very high wages, and the laborers many times are more or less uncertain. They may work a day or they may work several weeks. This gives to the industry a large degree of uncertainty.

Leading gravel companies in Dallas report that they are unable to fill orders. Particularly is this true of those companies that supply the local trade, delivering by truck from their gravel pit to the purchaser in the city. During the period of bad weather when gravel pits could not be worked to advantage and bad roads made hauling practically impossible, large orders accumulated, and these companies are now trying to fill these.

Companies that load gravel from their gravel pits to cars are also overrun with business. The J. Fred Smith Gravel Company, one of the largest in this section of the state, is running its shovels and drag lines to full capacity. The Trinity Sand and Gravel Company, the Clem Gravel Company, and others shipping their products out, report that they are overwhelmed with orders.

The gravel pits near Dallas, notably those operated by the J. Fred Smith Gravel Company and the Trinity Gravel Company, from which pit-run gravel of proper content for concrete mixing is taken, are filling most of these orders for road material and gravel for concrete work.

Gravel is being delivered on board the car at about $1 a cubic yard, but prices very considerably, depending somewhat on the gravel content and the accessibility of the pits.

Gravel is being delivered by motor truck or wagon in Dallas at prices that range from $2.50 to $4.00 a cubic yard. The price depends not only on the kind of gravel but also on the length of haul and the nature of the road. The West Dallas Gravel Company seems to be supplying most of the gravel delivered locally by truck.

Platforms and Walkways, Stairs, Ladders and Floors in Cement Mills

A Paper Delivered Before the Eighth Annual Safety Congress of the National Safety Council

By E. R. ABBOTT
Safety Engineer, Plant No. 1, Canada Cement Company, Ltd., Montreal, Canada

CEMENT plants that are being designed today take into consideration accessibility to bearings, overhead drives, etc.; but in many of the plants built several years ago this was not done and it is difficult to make these places safe for workmen.

About five years ago we took up seriously a Safety-First Campaign and it was early realized that good housekeeping and a clean mill were necessary if we were going to make any progress with the campaign. It became apparent to us that in order to keep our mill clean it was necessary that we should replace the wooden platforms and walkways with platforms made of material that would not allow the dust to sift through when being swept and cleaned up.

Platforms

In our grinding departments the ball mills, pulverizers, and tube mills are driven by motors placed on elevated platforms, or galleries, about 10 feet above the floor of the mill building proper. The pulley of the motors overhangs the edge of the platform, the center of the motor pulley being about 5 or 6 feet above the center of the mill pulley. When these platforms were originally installed they were built of timber covered with a 3-inch wooden floor. These platforms were never very satisfactory, owing to the fact that there was more or less vibration to the motors, which caused serious trouble with the bearings and coils. Another objection was the fact that whenever the floor was cleaned a shower of dust was precipitated on the floor beneath, through the cracks caused by the drying out of the flooring boards. It was also difficult to keep railings in proper repair, due to the vibration. Eventually we replaced these wooden structures with solid reinforced concrete platforms, with standard pipe hand rails along the edge, and steel and concrete stairs leading from the main floor to the platforms. These platforms have been highly satisfactory in every respect.

A more difficult problem was presented in the replacing of wooden platforms around elevators, along line shafting and other necessary overhead walkways and platforms, as well as floors in bridges, connecting different buildings and carrying conveying machinery. Owing to the fact that our mill had to be kept in operation while these replacements were being made it was necessary for us to use different types of construction. Wherever possible we put in forms and cast concrete slabs reinforced with wire mesh. This we consider the most desirable type of platform floor. In some cases we used what is known as "Ferro Dovetail" sheeting, covered with 2 inches of concrete on the upper side. This makes a very satisfactory floor, provided the lower surface is kept painted, or is covered with cement plaster. Another method was the use of perforated steel plates, but we only used this material where it was impossible to make use of concrete as these perforated plates had

the same objection from the standpoint of cleanliness as the wooden platforms.

Pulverized coal is conveyed from the coal house through an overhead bridge to the kiln room. To eliminate dust collection on the floor of this bridge and thus lessen the liability of an explosion, a floor was constructed of flat iron bars on edge, spaced about 1 inch apart.

We have under contemplation, plans to erect in our coal house, a system of walkways leading from all elevated platforms to a stairway built outside the building, so that employes will have a quick and easy exit in case of fire or an explosion.

Stairways

Stairways have been the cause of a great many accidents. Beyer states that out of approximately 90,000 accidents reported in one State during one year, from all causes, about 1 per cent came from falls on stairs. In addition to minor accidents these falls caused fractures and other serious injuries in many cases and one death.

The most satisfactory type of stairway for mill buildings, that we have used, are those made from 7-inch channel stringers with treads of 9-inch channels filled with concrete and finished rough with a wooden float. Standard specifications call for risers on all stairways where the distance to the floor is over 5 feet. If sheet metal be fastened to the underside of the stairs, thus preventing any material from falling through, risers are not required.

We also use stairs of solid concrete and those that have been erected inside the mill building have proved very satisfactory, but we have not had the same success with the outside ones. This is principally due to the fact that in removing snow and ice in the winter time the concrete becomes chipped and damaged to such an extent that it is dangerous and is exceedingly difficult to repair. The most serviceable and durable type of stairs that we have found for outside use is made of channel stringers, with ⅜-inch plate tread covered with 2-inch planks which are bolted to the plate.

Alleyways and Tunnels

All our conveyor tunnels under storages at this plant are of solid concrete construction. Where single conveyors are used the conveyor is placed against the wall at one side with a walkway along the other side. These tunnels are constructed 7 feet wide and 7 feet high. Where double conveyors are used the tunnels are constructed 11 feet wide and one conveyor is placed against each wall with a walkway in the center.

In the tunnels under the cement storages we had trouble with cement gradually building up on the floor, owing to dampness, in spite of the fact that care was exercised to keep the floors clean. To overcome this we laid over the concrete, a matched wooden floor, which has proved very satisfactory and is easily kept clean.

Floors

We do not know of a better material for floors in a cement plant than concrete. Reasonable care must be taken in the moving of heavy material on concrete to prevent pitting. One point in connection with concrete floors in a cement plant, that may be used to advantage in order to facilitate keeping the mill clean, is to eliminate the right angle between the wall and the floor. This is easily done by making what might be called a concave baseboard around the walls.

Platforms should be guarded as follows: Toe boards shall be provided and shall be 6 inches or more in height and shall fit tightly to the floor. Railings shall be provided. Height of top rail above platform to be 42

inches or more. Distance from floor or top of toe board to center of lower rail, to be not more than 18 inches. Posts to be not more than 12 feet apart. In general where we have passageways between belts, pulleys, etc., pulleys and belts are enclosed by screens and angle iron bars.

Under the heading of walkways might be mentioned the advantages to be derived from concrete walks around a cement plant. A few years ago we had no walks connecting our buildings and consequently the yard levels were always changing, especially near the doors, and it looked as if in a few years the floors of many of our buildings would be below the ground level. In wet weather the yard was a morass and much good lumber and material was destroyed by being used as temporary walkways. It was decided to establish permanent yard levels and construct concrete gutters around all buildings, close to the wall, to catch the eave water, and beyond the guters concrete walks. The original program was carried out and extensively enlarged. This expenditure has been a good investment. We are able to keep the yard clean, which we never did before and we spend less money in doing it. Many other advantages might be mentioned, such as saving time of employes, in moving about the plant or trucking materials from department to department, where it was formerly necessary to use a horse and cart.

We consider the liability of men being caught in conveyors one of our worst hazards. Screw conveyors are covered so that there should be no danger of men breaking through and we have taken an extra precaution by providing a walkway where men are likely to cross over.

Bucket conveyors travelling at a low rate of speed of about 30 to 50 feet per minute, do not seem hazardous, yet we had a fatal accident caused by a man stepping on one of the conveyors when crossing over. The only way to guard against accidents of this kind is to provide liberally proper walkways across conveyors to obviate the tendency of a workman taking a short cut. In the construction of walkways over conveyors we have used light angle iron frame, with sheet iron floor and steps covered with fabric belting to prevent slipping. In several cases where we have two bucket conveyors running side by side we combine a gear covering with a walkway.

New Texas Company

The Texarkana Gravel Company, Texarkana, Texas, has been incorporated with the following officers:—C. M. Conway, president; J. R. Johnson, vice-president; Louis Heilbron, secretary-treasurer; W. Troy Gaunt, assistant treasurer; total assets, approximately, $500,000.

The company owns in fee a large acreage in Bowie County, and has under lease numbers of acres of gravel. It controls pits on the main line of the Cotton Belt and on the Kansas City Southern. These pits are fully equipped with up-to-date machinery for handling gravel, etc. At the largest pit, Sledge, Texas, on the Cotton Belt, the sand gravel from the water pit is loaded direct to the cars by the centrifugal pump.

The operations of the company are being extended so as to have daily capacity of 100 cars of road gravel and 10 cars of concrete gravel.

Air-Tight Lime Containers

The advantage of the steel drum for shipping burnt lime was recently brought out by an inquiry to the National Lime Association from the Car Service Section of the Railroad Administration

This inquiry suggests important economies from the use of such a barrel, in conserving car space and freight storage; in addition to the eliminating of fire risk, elimination of the deterioration in transit and promotion of the larger use of such material in the chemical industries.

Accident in Open Cut Blasting

Missed Holes Probably Set Off By Sparks From Steam Shovel

ACCIDENTS caused by missed holes occur both underground and in open cuts. Many of them are avoidable and attention to the details of such accidents should make it easier to avoid them in the future. The following report of an accident, occurring in some open-cut steam shovel work, in which two men were killed, should serve as a warning in operations where any uncertainty exists about a missed hole and where black powder is being used. The accident referred to, occurred in an open pit in Utah, and is reported by the U. S. Bureau of Mines.

The height of the face at the cut is about 30 feet. Twenty 1¼-inch vertical holes 30 feet deep were drilled at the time and chambered with about 50 sticks of 1⅛-inch dynamite. After this, they were loaded with 8 or 10 cans of black powder in each hole, and exploded with an electric battery. The debris was then being removed by a large steam shovel. At the time of the accident the dipper was working on the right side of the cut, the boom being turned to the right. The engineer and craneman were in their places, both being on the right hand side towards the shot. When the dipper was just starting at the grade, to take a load, a flash was seen, followed by an explosion a few seconds later. Most of the men ran under the shovel, two or three did not quite get out of danger and were slightly hurt. The positions of the engineer and craneman were such that there was no chance for them to escape. The engineer's body was found lying on the cab floor, and the craneman's body was found between the cab and boom beam, both being killed by the fall of blasted rock.

This seems to be a clear case of a missed hole, exploded by sparks from the steel dipper. One of the pitmen said they saw a flash and all ran for the shovel.

The formation at the surface is full of cracks and crevices. Also, the springing of the holes would naturally open cracks. The explanation of the cause of the accident is that, when loading the black powder, some of the powder ran down one or more of these cracks and filled a small opening not far from the loaded hole; at the same time, leaving a trail of powder from one point to the other. This explains the lapse of time between flash and blast. Sparks from the dipper just as it reached the powder caused the trouble.

The foreman and the pitmen say they have often seen unexploded black powder in small quantities among the rocks, but that no flash has been seen before; also, that this was the first missed hole they have known of, though most of these men have been on the job only a month or two.

This accident emphasizes the necessity of careful search of any place where blasting has been done for evidence of missed holes. In the cases where black powder is used the injection of water would serve as an effective preventive of an explosion.

The Decatur Sand and Gravel Company, Decatur, Ill., is about to install an electrically driven sand pump, which will be operated from a boat 19x25 feet in dimension, the machinery to be driven by a 200-horsepower motor for which the Decatur Railway & Light Company will provide the motive power. This will increase the capacity of the plant from 200 to 1,800 cubic yards per day. Unless weather conditions interfere, the new plant will be in operation within a month.

Says Cement Rates Are Discriminatory

Atlas Company Asks For an Adjustment Between Pennsylvania and Hudson Districts.

AN ATTACK on the relativity of rates on cement from the Lehigh and the Hudson districts to New England destinations has been opened by the Atlas Portland Cement Company, which seeks to bring about an adjustment, which, in its opinion, its location on the western edge of New England warrants. Nine formal complaints have been prepared and filed against each of the delivering roads in New England, accusing them of unduly preferring the cement originating in the Pennsylvania district and unduly burdening the cement from the Hudson district.

The first of the complaints, No. 11110, Atlas Portland Cement Company, was placed on the files of the Interstate Commerce Commission January 7. In it Frank Lyon, the attorney, and Walter Young, the general traffic manager, for the complaining company, set up comparisons of rates on cement from the two districts. Then they show the rates on anthracite coal from the two districts. The rates on cement from Lehigh to New England are lower than the rates on anthracite coal, while on cement from Hudson the rates are higher than on coal. The rates on hard coal from the Lehigh district to New England destinations are shown in the exhibit attached to the complaint mentioned to be from 60 cents to $1.40 per ton higher than the rates on cement.

From Hudson the rates on cement are from 80 cents to $1.20 per ton higher than on coal. Other showings are that the rates on cement from the Lehigh district are lower than rates on stone, brick, clay, sand, from Spring Mill, Pa., asphalt, slag, lime and zinc ashes, all of which move in open top cars while cement must be carried in water tight box cars. The exhibits emphasize the fact that the disparity, in favor of cement from the Lehigh district, between cement and anthracite coal is against a commodity that moves in ten times as great volume, in any kind of equipment that will contain it and in trainloads, while the cement moves in carloads in equipment that must be in first-class weather proof condition; that the preference for cement also causes an undue burden to be placed on the other low grade commodities mentioned.

The prayer is for just, reasonable, and non-discriminatory rates for the future, without suggesting whether the rates on cement from Lehigh should be increased or the rates on coal should be reduced. The reasonableness of rates on anthracite coal to New England has never been under direct scrutiny by the Commission. In its big anthracite coal rate inquiry, it directed attention specifically only to rates to tidewater and to the Niagara frontier.—Traffic World.

The California State Harbor Board, is operating locomotives about San Francisco Bay that are supplied with sand from a central drying house which was specially built for the purpose. A steel drier shaped like an inverted cone receives the wet sand, a central heater removing all moisture and allowing the dry sand to pass through openings at the bottom. This sand is then shovelled into a large air-tight tank, and placed under heavy air pressure. To replenish the sand box of his locomotive all the fireman has to do is to insert it into the end of the pipe leading from the tank. The valve handle which is conveniently located is then turned, pushing the sand up from the tank and into the sand box. The entire operation requires only ten seconds.

Largest Producers of Talc and Soapstone

America Leads the World in Production and Manufacture

AMERICA leads the world in the talc and soapstone industry, not only in production but especially in manufacture and use. The output of talc in the United States sold in 1918, according to J. S. Diller, of the United States Geological Survey, Department of the Interior, was 191,477 short tons, having an average value of $10.91 a ton. This was a decrease of about 7,000 tons in production as compared with that of 1917 but an increase of more than $200,000 in value.

Talc was not considered a war mineral and its production was retarded by the war, but the spread of knowledge concerning its uses and its usefulness has stimulated the talc industry. Its more general use has been promoted by the formation of a talc and soapstone producers' association, of which Freeland Jewitt, of Boston, is president.

Vermont produces the largest quantity of talc, but the output of New York is of greater value. California ranks third in quantity and value and, notwithstanding the general decline in production elsewhere in the United States in 1918, it more than doubled its output of 1917. California produces some soapstone, but the bulk of its production is ground talc, mined in Inyo and San Bernardino counties, where it is more or less intimately associated with limestone and in part possesses a fibrous structure similar to that in much of the talc of the Gouverneur region, New York.

The United States produced about 58 per cent of the world's output of talc in 1918 and in addition imported more than 11 per cent of all the talc produced by the rest of the world. As little if any talc was exported, it is evident that the United States is preeminently a consumer of talc. Canada is the only competitor for the domestic trade in middle-grade talc. About 12,000 tons, 96 per cent of the talc imported in 1918, came into the United States from Canada.

The United States is well supplied with low and middle grade talc, but lacks high-grade material for use in toilet powder, electric insulators, and gas burners, commonly called lava tips. The talc used for such purposes is imported mainly from Italy and France and, through other countries, from India.

Within the last two years a new and interesting source of talc has been found in a large dike of serpentine in Harford County, Md.

Virginia is the only great producer of soapstone in the world, shipping more than 15,000 tons in 1918. The production has, however, declined irregularly for the last 10 years. Soapstone is one of the rocks that are most widely useful to primitive peoples, who, on account of its softness, resistance to sudden changes of temperature, and slow radiation of heat, employ it chiefly as "potstone"—that is, for making pots. We make a similar use of it in soapstone stoves, foot warmers, and disks for fireless cookers, although in this country it is used principally in laundry tubs, laboratory tables, hoods and sinks.

The Miami Sand & Gravel Co., of Dayton, Ohio, capitalized at $40,000 has been incorporated, by G. H. Gengnagel and others.

Every man in business will have to go over a hard road and find out its turnings for himself, but he need not go over his road in the dark if he can take with him the light of other men's experience.—John Wanamaker.

Methods of Loading Quarry Cars

By DANIEL J. HAUER

IF ROCK is to be loaded upon cars, the only way to do it would seem to be to go about the task and get it done; yet there are many kinks about loading heavy stone into vehicles that mean a saving of money and a larger output from a quarry. This is especially true of crushed stone quarries. It is proposed to point out the different methods of loading and show some economic features of this work, all of which have have been tried out in some section of the country, yet may not be known in other localities.

Generally speaking, the commonest method of loading cars is by hand. It is true that in many large quarries, machines, such as steam shovels and derricks, are used for loading, but their number is much less than those using hand methods.

The height of a car for machine loading is not a serious matter, but for hand loading it is all important. The least work that a man does in foot pounds is in raising loads vertically. Thus the higher the car the lower the efficiency of the man.

There are many excellent types of cars that are used in quarries for hand loading, but one of the best types is shown in the sketch in Fig. 1. This car is only a couple of feet high and can easily be loaded over the sides. The wheels revolve on the axle as does a cart or wagon wheel. These cars are built with a swinging gate, hinged at the top; the car being designed to dump its load by means of a tipple.

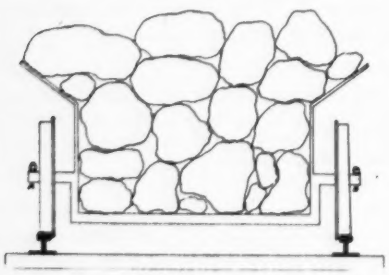


Fig. 1—Low down car for hand loading, without end gates. Note rock piled in ends by hand.

The doors are meant to keep the stone from falling out, but they are not necessary if the stone is carefully placed in each end, as shown in the illustration. The elimination of the doors in one quarry was found to effect a saving in repairing the cars during a year of about $5.00 per car. This in itself was quite a saving.

The placing of the stone at the end consumes but little extra time. First, large boulders, the largest that the crusher will take, are rolled up a short piece of plank and placed, then smaller pieces are used to top out.

The end of the car away from the breast of the quarry is first loaded. Then larger boulders are rolled into the center of the car and fine stuff is also shoveled or forked into the center, after which the other end is closed up. When such a car goes onto the tipple the load is dumped quickly, the doors not interfering with the large boulders. In fact, much larger boulders can be loaded through the ends than can be over the sides, saving much sledging and explosions in breaking up boulders. If several short pieces of heavy plank are kept handy, the largest boulders do not have to be lifted, but are rolled as explained.

Another item in which time is saved is in unlatching doors at the crusher. It would not be advisable to load cars without doors if the cars must ascend a steep incline.

Even when doors are used on this type of car, or when cars are used with a rear door only, much more economical work can be done if a stick or iron rod is used to prop the door open, so that the stone can be loaded through the open door instead of over the top of the car. The car with the door on one end is extensively used in quarries where the track is run over the top of the crusher and there must be a door to keep the stone in the car, as the incline of the track is sufficient to dump the load.

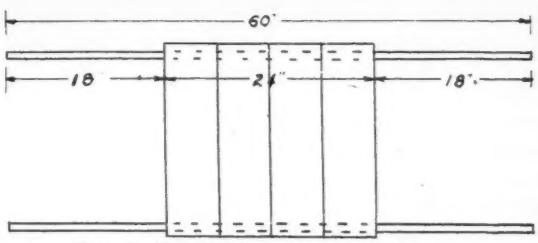


Fig. 2—Devil for loading boulders.

The low down type of cars cannot be used in all quarries, especially with the present plants, so that quick and economical methods of loading the higher cars must be considered. It is surprising how many large stones, of such size that four men can not easily handle them, can be loaded into fairly high cars by means of skid planks. The plank is placed against the end or side of the cars and the heavy boulder rolled up on it by turning it over until it has been gotten up about half way, when the end of the plank is raised high enough to cause the rock to slide into the car. If the stone is very heavy it is advisable to use props under the end of the plank to hold it until the men can get a new grip on the plank to give it the necessary heave to chute the stone into the car.

Another means of loading boulders into a vehicle is to use a devil, as it is called. A sketch of one is shown in Fig. 2. It is made of round poles with an inch and a half plank nailed to them. The planks protrude over the side of the poles. The devil is laid on the ground and the boulder rolled onto it. A few spalls placed under the handles will allow the men to pick it up easily. The devil with the boulder on it is carried to the car and the protruding ends of the planks are placed on the top of the car and the devil tilted so as to throw the boulder into the car.

By means of a devil two men can load many boulders that it would take four men to load with their hands, and four men can load those of such size that six men might handle if they could get a hold on the stone. This devil is a great time and money saver in any quarry doing hand loading, and every gang should be provided with several of them. These devils will also be found useful in carrying other loads around the quarry, as blasting batteries and wires, dynamite in cases, small drills and many other articles. They are inexpensive to make, as they are made of round poles and scrap lumber.

For loading fine stuff into cars, shovels or forks should be used. Stone forks are more economical for any size of stone that will stay on them, as they are easier to run into a pile and carry a larger load than a shovel. For the very finest pieces of stone the

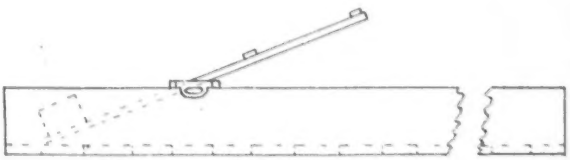


Fig. 3—Showing chute with door. Note heavy hardwood block at end of door to keep it down and act as batten.

shovels must be used. The writer's preference is for a long handled round point shovel especially designed for shoveling rock.

One great mistake made in many quarries where hand loading is done is to sledge up and make piles of stone and then load from these piles. The writer has seen this practice carried on to such an extent that every piece of rock in the quarry that was carried to the crusher was handled twice at the breast of the ledge. Thus the cost of production was greatly increased. The proper method after a blast is to do the sledging and loading in one operation. That is, the muckers that do the loading also do their own sledging, or the sledgers move from gang to gang as they are needed. Thus the piles of blasted rock are cleaned up as they go instead of being sledged and repiled. The use of skid boards and devils, as already outlined, is a great assistance in this method. The only exceptions to this are very large boulders that have to be broken up by a derrick and ball or by the use of explosives. These are cleaned around and broken up at the noon hour or the end of the day's work.

Board and metal chutes are also useful at times in loading cars. This is the case when blasts shelve the ledge and a large amount of the rock remains on the shelf some distance above the quarry floor. Instead of throwing all of this rock down to the quarry floor and then raising it up to load into the car, chutes can be used

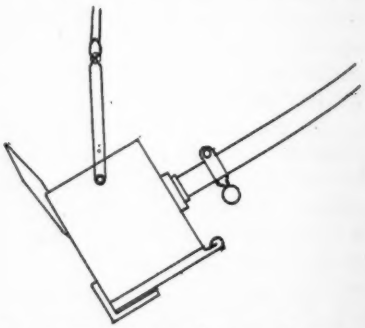


Fig. 5—Showing collar on dipper arm with eye to hook chain.

from the ledge running directly into the car. This saves considerable time and money. There is seldom any difficulty in placing the chute at such an angle as to make the stone slide in it. The only thing is to prevent the large rock from injuring the car. This is done by having a swinging door on top of the chute near the lower end, to break the speed of the stone as it falls. This is illustrated in Fig. 3. On very steep chutes several of these doors may have to be used.

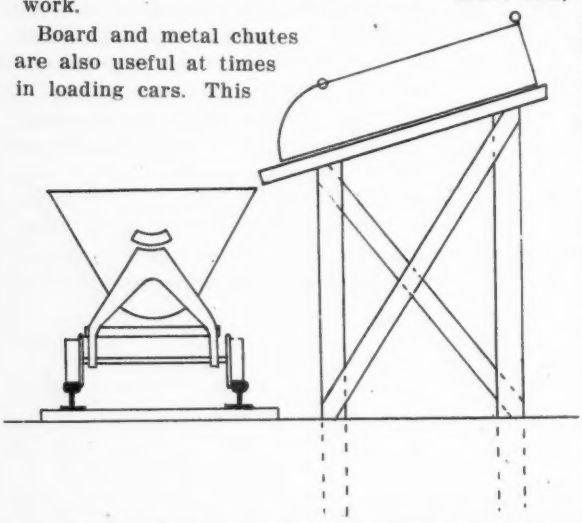


Fig. 4—Platform for skip to dump into cars.

If a new lift is to be started in a quarry such chutes can be used to handle all the rock into cars on the quarry floor until the new floor on the ledge is so developed as to take cars.

Frequently permanent chutes are used in dumping cart loads or small cars into larger cars. This is done in some pit quarries where the large

cars running up and down the incline are not taken to the breast of the ledge. It is done frequently to save trackage in the quarry, and some believe that the cars up and down the incline can be run with greater reg-

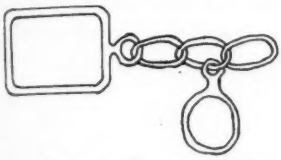


Fig. 6—Chain to fit over dipper teeth.

ularity. Then, too, old equipment can be used in the quarry, using the new modern equipment on the incline.

Platforms are sometimes used in loading cars. Carts and wagons are driven upon platforms and their loads dumped over the edge into cars. When derricks are used for loading cars, or even cableways with skips are employed, it is not advisable to attempt to make an aerial dump into cars, but instead a platform is used as shown in Fig. 4. The sketch shows how the skip is landed on the inclined platform and then the rear end raised and dumped into the car. This method is quicker than aerial dumping and more effective.

In loading cars with steam shovels there are many little kinks that mean more work done and money saved. For instance, there are many boulders that may be too large to go into the dipper of the shovel, and to get them balanced on top of the dipper between the teeth and the bail takes time. Also, to dump them off the dipper means time lost, as well as the chance of injuring the cars. All this can be avoided by placing a band with an eye on it around the dipper arm, as shown in Fig. 5.

With a chain already fastened around a boulder the hook can be fastened in the eye and the boulder quickly loaded. There should always be a number of short link chains used around a shovel. Three or four should have one end arranged as shown in Fig. 6. This chain has a large square link to fit down easily over the dipper teeth. On its second link it has an extra link into which the hook on the other end of the chain can be fastened. On such a chain a pair of dogs, such as shown in Fig. 7, can be slipped and the boulder picked up by the dogs.

Thus with four chains, one on each tooth, and another chain on the dipper arm, five boulders can be loaded at one time into a car. Small stones can have chains placed around them, while large boulders, too heavy to be rolled over, can be picked up by the dogs, if small pieces protrude, or with a hammer and hand drill enough of a hole can be drilled in the ends of the boulders for the dogs to take hold and raise the boulder. While the shovel is picking up fine stuff the pit men can fasten the chains to the

Fig. 7—A pair of dogs to go on a chain.

pieces of rock and then the chains can be attached as outlined without loss of time.

By these devices there is no slipping of the chains, and the efficiency of the shovel is greatly increased. Less damage is done to the cars by handling large boulders in this manner.

Every steam shovel should be equipped with a small air compressor and a hammer drill, so that boulders that are too large to go into the crusher can be quickly drilled and broken up, so as not to impede the progress of the shovel.

A steam shovel should also be equipped with an electric light plant so that the shovel can work at night, but that is another story and will be dealt with in an article at some future time.

Kickapoo Rates to be Readjusted

Changed to Meet Competition in Chicago Zone—Reparation to Be Made

A READJUSTMENT of the rates on sand and gravel from Kickapoo, Ind., and Ginger Hill, Ind., to Chicago is to be made by the Director-General and the railroads on or before April 20, in accordance with the terms laid down by the Commission in No. 10528, Kickapoo Sand & Gravel Company vs. Atchison, Topeka & Santa Fe et al., opinion No. 5982, 55 I. C. C. 657-60. The rates from Kickapoo are not to exceed those from Ginger Hill nor are they to be more than five cents a ton higher than the rates on the same commodities from Algonquin and other inner-zone points into Chicago. Reparation is also to be made to the complaining company for differences in rates greater than those authorized for continuance after April 20. Rates for joint and belt line deliveries are not to exceed 70 cents per ton.

Kickapoo is 113 miles from Chicago on the Chicago & Eastern Illinois. It is just beyond the average distance of sand and gravel pits in what is known as the outer zone of the Chicago district, while Algonquin is treated in the report, written by Commissioner Woolley, as a representative inner-zone point. In 1907 the Kickapoo pits were opened and the rates were made, by the Chicago & Eastern Illinois, to approximate the charge then applied for connecting line deliveries on shipments from the inner-zone, the average distance of which from Chicago is 50 miles, while the average distance from the outer zone is 93 miles.

That relationship continued for ten years, with a little interruption in 1914, when the Commission made its five per cent decision. The decision put up the interstate rates. The Illinois commission, however, declined to allow the advance on intrastate business, so the basis established in 1907 was restored and continued until 1917, when the Commission's decision in the fifteen per cent case sent the relationship into the air. The situation was made still more uncomfortable for the complainant when General Order No. 28 was applied. There was then no situation worth mentioning, for, according to the report, the Kickapoo company was kept out of the Chicago market.

The complaint's real interest, the report says, is to bring about a restoration of the relationship between the rate from Kickapoo and Ginger Hill, and that is the purpose of the order. The report says the Kickapoo company does not care whether this is brought about by an increase in the Ginger Hill rate or the reduction of the Kickapoo rate.

Admitting that the rate on sand and gravel from the outer zone to Chicago is undoubtedly low, Commissioner Woolley remarked that the commodity is also the lowest class of commerce, influenced by so small a difference in rates as one-fourth of a cent a hundred pounds, or five cents a ton. Such a difference, he said, would keep shippers out of the Chicago market, which has been the plight of the complainant. Woolley said the discrimination against which the Kickapoo complained could easily have been avoided. The local rate from Kickapoo, he said, was increased 25 per cent, in accordance with the Director-General's order, while the local rate from Ginger Hill was increased only 2.5 per cent. The joint rate from Kickapoo was increased 20 per cent, while there was no increase in the joint rate from Ginger Hill.

The decision of the Commission

was that the rates were unreasonable and unduly prejudicial from April 22 to June 25, 1918, to the extent that they exceeded rates from Ginger Hill and thereafter to the extent that the rate from Kickapoo to Chicago and points in the Chicago switching district for local delivery exceeded the Ginger Hill rate for local delivery.

It was held that the Director-General did not avail himself of the increase permitted by General Order No. 28 in respect of the rates from joint and belt line deliveries from Ginger Hill, thereby unduly preferring that point. Therefore, the rate from Ginger Hill, after June 25, was two cents under the rate from the inner zone, although it is 93 miles from Chicago.—Traffic World.

Indiana Sand Way Above Standard

Highway Engineer Says It Runs Much Above Ottawa Tests

IN INDIANA the highway specifications require that the sand for concrete roads shall run neck-and-neck, so to speak, with standard Ottawa sand.

This is a pretty stiff requirement, most states usually knocking off varying percentages from the standard, to allow for deficiencies in local materials. And even in states where requirements are only 75 per cent of standard, the samples do not always get by.

But in Indiana there is never any trouble with the sand tests, according to H. K. Bishop, chief highway engineer. In fact he says it would be reasonably safe to use Indiana sand without test, as no samples since he has been in office have ever fallen below the standard Ottawa tests. On the contrary they run from 25 to 90 per cent above.

He Looks Like Lincoln

That's What They Say of a Gravel Producer in Eastern Indiana

IT EMBARRASSES J. W. Gwinn, of Anderson, Ind., to have any reference made to his personal appearance. So he always sidesteps when anything is said about photographing him; otherwise we could show you conclusively that he resembles Lincoln in many characteristics.

For one thing he is tall, erect, with a strong and sturdy frame—though scarcely deserving the description of "raw boned" which was sometimes applied to the great president.

Gwinn's face is smooth shaven, so that any comparison will have to be made with the St. Gaudens statue of Lincoln, which is perhaps as accurate as any; and the Indiana man could, with a slight make up, pose as this statue in any patriotic tableau and get away with it remarkably well.

Incidentally it might be remarked that Gwinn Sr., father of J. W., is also famous in his locality as a Lincoln counterpart. He wears a beard, and thus brings to mind the more conventional Lincoln portraits.

The son is supplying a large part of the gravel for the road work in his county.

The Hudson Sand and Gravel Company, Kittaning, Pa., has been incorporated by G. P. Boarts and others. Capital $5,000.

The Western Pennsylvania Crushed Stone Company, Dover, Del., has been incorporated by A. H. MacLenan, West Chester, Pa.; C. G. Rosenbaum, Harrisburg, Pa., and Curtis Truxal, Somerset, Pa. Capital $150,000.

Louisville Is Prepared For Convention

State Association Will Also Meet —Many Notables to Be Present

INTEREST among the local crushed stone people in Louisville now centers quite largely around the coming meeting which is scheduled February 9, 10 and 11 and at which time it is expected to have a full gathering of the Kentucky Crushed Stone Association present.

R. B. Tyler is secretary of the Kentucky association and active in helping shape up the local program. At the present writing the features of the local program are: first, that the dates have been shifted from February 10, 11 and 12 to February 9, 10 and 11, with the banquet of the National Crushed Stone Association on the evening of the 10th.

Arrangements are being made to have Governor Morrow present at the banquet.

Arrangements have been made to have A. J. Gutheim of the car service section of the Railway Administration present to discuss the question of cars, car movement, etc.

W. Scott Eames, of the New Haven Trap Rock Co., New Haven, Conn., will show moving pictures of his plant and property during the meeting.

All told, there are three organizations scheduled to meet at this time, the National Crushed Stone Association, The American Road Builders Association and the American Asphalt Association, and the eleventh annual Good Roads Show. It is presumed that in addition to this there will be some local group meetings, especially as it is intended to have a conference of the Kentucky association, and all are looking forward to a great time with an unusual attendance because conditions are such now as to make imperative a getting together and conferring one with the other of the crushed stone people and those interested in kindred lines of work.

Mayor Smith of Louisville has extended an invitation to mayors, city engineers and superintendents of streets of every leading city in the country to attend this gathering which he figures will be interesting to them; and this in turn should add interest to the meeting itself.

As to the local trade situation, while it is naturally a time of slow going and little business both in crushed stone and in sand and gravel, it is interesting to note that building operations are getting under way at a better rate than usual this early in the season. This is due in a great measure to the fact that there was so much hesitancy about building last year that the need for getting into action is more urgent now than ever before. This coupled with the realization that there is no need to expect price reduction soon has led to more active work, which in turn has resulted in more demand for sand and gravel for building operations during the first month of the year than is customary in mid winter. The weather in the main has been unfavorable, either cold and freezing or rainy. This has hampered building operations but efforts have continued in spite of the weather and while the demand for sand and gravel is not comparable with that of the spring and summer season it has been of unusual volume for mid winter.

This is taken by local dealers as an indication that it is to be an exceedingly busy year in building operations and they are making preparations accordingly. That is, they are preparing to dig and supply more than the normal volume of river sand and gravel.

Building New S. & G. Plant at Knoxville

Kinzell-Thompson Company Increasing Facilities to Meet Season's Demand

A MODERN unloading, washing, storage and reclaiming plant, costing from $40,000 to $50,000, will be erected in Knoxville, Tenn., by the Kinzell-Thompson Sand & Gravel Company. The plant is to be near the bank of the Tennessee river about one-fourth of a mile west of the bridge at Gay streets. The contract for erection of the plant was awarded to the Stephens-Adamson Manufacturing Company, of Aurora, Ill.

"We have the utmost confidence in the growth of Knoxville, and it is for that reason that we are expending this sum for a modern plant for handling sand and gravel," stated Fred L. Conner, president of the Kinzell-Thompson Sand & Gravel Company. "We expect Knoxville to grow rapidly, and that there will be large building projects, requiring the use of sand and gravel for concrete. Otherwise we could not think of building such a plant here."

The sand and gravel will be taken from the river bottom by a 90-foot derrick boat, operating a clam-shell bucket. This bucket will pick up 2 cubic yards of gravel at each operation. It is to be unloaded into scale boards, or boxes, which are carried on the barges. Three or four barges will be taken to the unloading plant at a time. The scale boards will be picked up by an electrically driven derrick and dumped into a large concrete hopper. From this it will be carried on endless rubber conveyor belts to the washing plant. All sizes of gravel and sand go into this plant and are sorted. The oversize rocks, which will not go through the screens, will be crushed and rescreened. The crusher is located by the washing plant.

After the sand and gravel is washed and sized, being separated into four classes, it is carried by another conveyor to large storage piles. A concrete tunnel is run under this pile, with large openings under each size material. These openings can be closed or opened when needed. Still another conveyor belt runs through this tunnel, upon which the particular size of sand or gravel that is needed may be dumped through the opening. This conveyor then carries the material to the loading station, a short distance away. Here it may be dumped into cars, wagons or trucks.

All this is done without the material being handled at any time by hand labor. Eleven electric motors are used for operating the various conveyor belts, screens, etc. A motor also operates the pump which supplies the water for washing the sand and gravel after it is taken from the river. This pump throws 1,000 gallons a minute.

The Kinzell - Thompson Sand & Gravel Company is now operating two dredge boats, a traveling crane and three derricks. The new plant will supplement all these, Mr. Conner stated.

Not long ago a great dragline excavator, owned by the U. S. Reclamation Service, crossed the Rio Grande under its own power. There being no heavy bridges, it became necessary to devise some means of transporting the huge machine to the opposite shore. Although this giant moves on broad endless treads, the river bed was so soft at the point of crossing that heavy "mats" were made of timbers bound with cables. These were placed before the excavator as it crawled along, and picked up to be used again and again until the crossing was accomplished.

Sales Good Despite Price Advance

Marked Activity in Eastern Territory, With Several New Companies Formed

WITH the turn of the year has come still greater and more concentrated activity in the sand, gravel and crushed stone industries in the Eastern districts. Prices in certain directions have shown an advance and despite such increases, orders have been placed for considerable tonnages for early delivery. This is an indication of the stability of the market and the outlook for a big year in these lines of trade at New York and vicinity during 1920 is exceedingly bright. The enormous increase in building operations is responsible for the prosperity in the trade to a large degree, and as large construction work of all kinds is anticipated during the next 12 months, the producers look for busy times. Clean Cow Bay sand is now quoted at $1.90 a cubic yard in the New York market, and a number of important contracts have been placed at this figure; dealers are asking in the neighborhood of $2.50 a yard for the material delivered on the job, while a fine grade of white sand is being sold at $4.50 a yard, delivered. Crushed stone is selling for $3.25 and $3.50 per cubic yard, ¾-inch and 1½-inch sizes, and gravel of the same sizes is quoted at a like figure. With these existing prices, it is rather interesting to make a little comparison—in 1912, the local market was holding at 45 cents a cubic yard for Cow Bay sand, and at 85-cents a yard for crushed stone and gravel, respectively. There is a good movement in cement, with price maintaining at $3.40 per barrel, delivered. The building stone market is fairly active, and such commodities as limestone, sandstone and bluestone are in firm call. Good grade limestone is selling at $1.35 per cubic foot, sandstone at $1.50 and bluestone slightly over a dollar.

A number of new companies have been formed to operate in the New York districts. These include the Shipway Marble Co., operating with capital of $50,000, to engage in quarrying work; the company is headed by A. G. Andrews, S. G. Dekay and A. Sargent, 1133 Broadway. The Tuscan Granite Co. has been chartered by B. R. Swartburg, A. J. Volk and G. T. Hutchings, Jr., 100 West Seventy-eighth street, New York, to operate locally, with capital of $10,000.

The activity in New York trade circles is reflected among the sand and gravel producers in different parts of New Jersey, and there is a decidedly optimistic tone in the industry. The Beach Glen quarry, near Rockaway, N. J., is now shipping about 100 tons of rock from its plant daily, with destination, for the most part, to points in South Jersey; the derrick and engine at the quarry have a capacity of 20 tons, and blocks weighing about 15 tons are going forward in the different shipments. The Limestone Products Corporation, Belvidere, N. J., has been organized with a capital of $1,500,000 to operate in this vicinity. The company is headed by William E. Horne, Edward L. Bixler and William H. Morrow.

In the Lehigh Valley cement districts of Pennsylvania, bigger operations are developing and the important companies in this section are planning for a big producing period during 1920. The Alpha Portland Cement Co., Easton, Pa., has resumed operations at all of its plants, some of which have been idle for several months; these include the plants at Martin's Creek, near Phillipsburg, N. J.; in New York state, at Cementon;

and at Manheim, W. Va. John Magee, Easton, formerly superintendent at the Martin's Creek Mill, has been appointed production engineer for the company. The Bath Portland Cement Co., Bath, Pa., has acquired property totaling about 300 acres at Sandt's Eddy, near Easton, as a site for a new cement mill; a portion of the land contains fine cement making rock, and these deposits will be worked; the property at one time was held by the Quaker Portland Cement Co., now dissolved. The Atlas Portland Cement Co., Northampton, Pa., has acquired control of the Standard Portland Cement Co., at Leeds, Jefferson County, Ala., for a consideration said to be about $1,000,000. Plans are under way for extensions, to increase the present capacity.

The stone crushing plant of the Advance Industrial Supply Co., Greystone, near Charmain, vicinity of Waynesboro, Pa., was destroyed by fire early in January with loss estimated at about $200,000. The plant comprised a three-story building, 40x125 feet, with complete equipment and machinery for reducing and grinding native green rock, used for slag roofing and kindred product manufacture. The works have been in operation for about 10 years and the machinery installation was valued at close to $125,000; about 100 men were employed. It is understood that the works will be rebuilt.

A number of new sand, rock and gravel companies have been organized in the different Pennsylvania districts during the past fortnight. Among these are the Hudson Sand & Gravel Co., Kittanning, to operate with a capital of $25,000, H. P. Boarts heading the organization; the West Penn Crushed Stone Co., West Chester, Pa., organized under Delaware laws, with capital of $150,000, to operate stone properties in this section; the directors are: A. H. MacLean, West Chester; C. G. Rosenbaum, Harrisburg, Pa., and Curtis Truxal, Somerset, Pa. The Blue Mountain Slate Co. has been organized with a capital of $30,000 by James Owens and associates, to operate at Slatington. At Pittsburgh, the General Rock Products Co., has been chartered with a capital of $10,000 by R. T. Rossell, 747 Union Arcade Building, L. R. Martin and C. J. Nicklas.

The sand and gravel producers in the Pittsburgh district of Pennsylvania are experiencing active times, and there is not only a good call for material, but every effort is being made to maintain production at the best possible point. The Keystone Sand & Supply Co. is making numerous shipments of material from its large loading docks; an extensive stock is being maintained for prompt handling of orders. The company is utilizing the "off season" to make needed repairs to its fleet, and the towboat "Keystone" has been placed on the ways at the plant of the Dravosburg Dock Co. Part of the fleet of the Rock Point Sand Co. is tied up at the winter quarters at Rock Point, on the Beaver River. The Rodgers Sand Co. is among the active organizations in this section and is engaging under extensive output at its works at Ambridge. The company does a large business with a number of the steel companies, and owing to the heavy ice in the Allegheny River was recently forced to suspend operations at Cheswick.

Repairs for Quarry Equipment

The Taylor-Wharton Iron & Steel Company, High Bridge, N. J., has just issued Bulletin No. 120 which will be of vital interest to the stone, sand and gravel interests. This bulletin outlines repair parts for quarry and crushing machinery.

TISCO MANG

The producer

of stone, sand, gravel knows that the urgent work of the coming season will not admit of delays. He will have to be in a position of security if he hopes to meet the demand for aggregates for roads, buildings and other classes of construction. This year is expected to bring a harvest to producers of these three widely used materials, and those who will get ready for the rush will reap the benefits.

How Prepare?

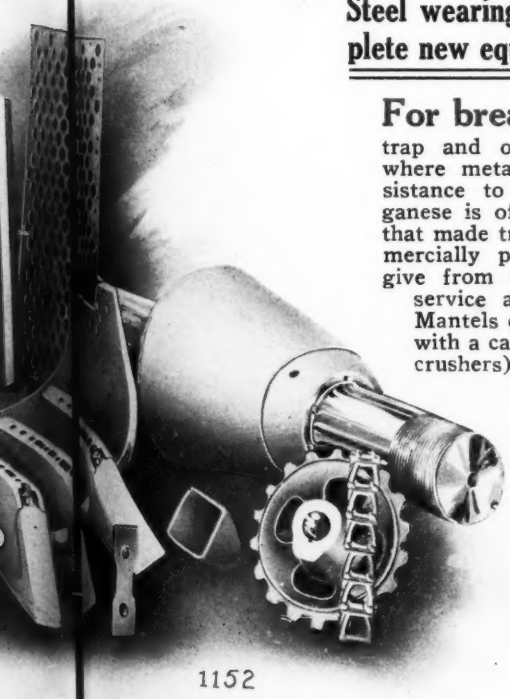
Can it be done by using odds and ends you may pick up from time to time as needed? Emphatically "No"! That is a makeshift method, unworthy of a good business man. Only by preparing your plants to last the longest possible time, enabling them to take care of orders promptly as they come in, can you cash in on a heyday of business to the fullest extent. You may think you have new machinery that will certainly take care of you against others who have repaired older equipment, but that is a "yes" and "no" proposition. Yes—if you specified on your order that the wearing parts of your various new equipment be furnished of TISCO Manganese Steel; No—if you have specified other wearing materials.

In the illustration is shown a ste... reversible dipper teeth for a 2½-yard... steam shovel parts of manganese are ... dippers. The manganese crusher pa... crusher head, concaves or staves, an...

TAYLOR-WHARTON IRON&

NESE STEEL

***A repair job* with TISCO Manganese Steel wearing parts is better than a complete new equipment with other materials.**



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...rd dipper front equipped with Panama ... Similar fronts and teeth with other ...le for any and all makes and types of ...n include a jaw plate, screen plate, ...ers for rotary pulverizer.

For breaking granite

trap and other very hard and tough rock where metal of toughness, strength and resistance to wear is required, TISCO Manganese is of first importance. It is the steel that made trap and granite rock crushing commercially possible. TISCO Manganese will give from four to six times the length of service as the same part in chilled iron. Mantels can be made smooth or corrugated, with a cast iron center (or solid, if for small crushers) and of any design the customer desires. Jaw plates for some crushers are carried in stock, others made up upon receipt of customer's orders.

Screen plates made of TISCO Manganese have many advantages. They wear many times longer than punched plates, due to their holes tapering from a given diameter on the inside to a larger one on the outside, by which means the screen is kept clean of stone and the holes do not tend to elongate.

Preparation for this coming busy season should include the policy of ordering manganese steel wearing parts for parts subjected to excessive wear and hard usage. If you adopt this policy, you will avoid shutdowns due to breakage or worn parts, keep the plant running, and turn out the dollars.

We Can Take Care of You

TISCO has provided ways and means of taking care of the increased demand for all kinds of wearing parts for crushing machinery, screens, conveyor chain, sprockets and buckets; lips, fronts, Panama reversible dipper teeth, etc., for steam shovels; hammers for pulverizers of any standard make.

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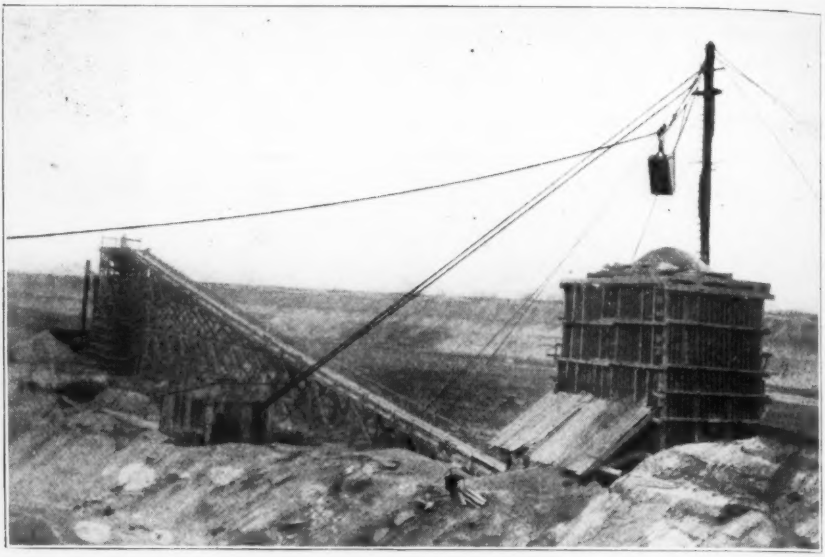
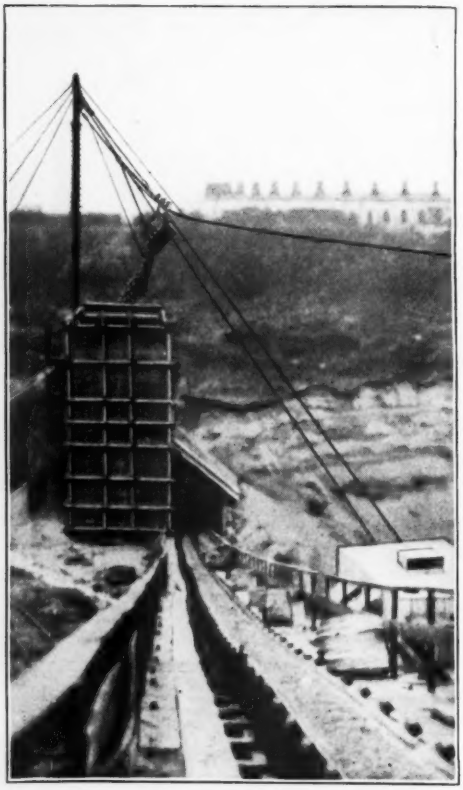
RON & STEEL COMPANY HIGH BRIDGE, NEW JERSEY





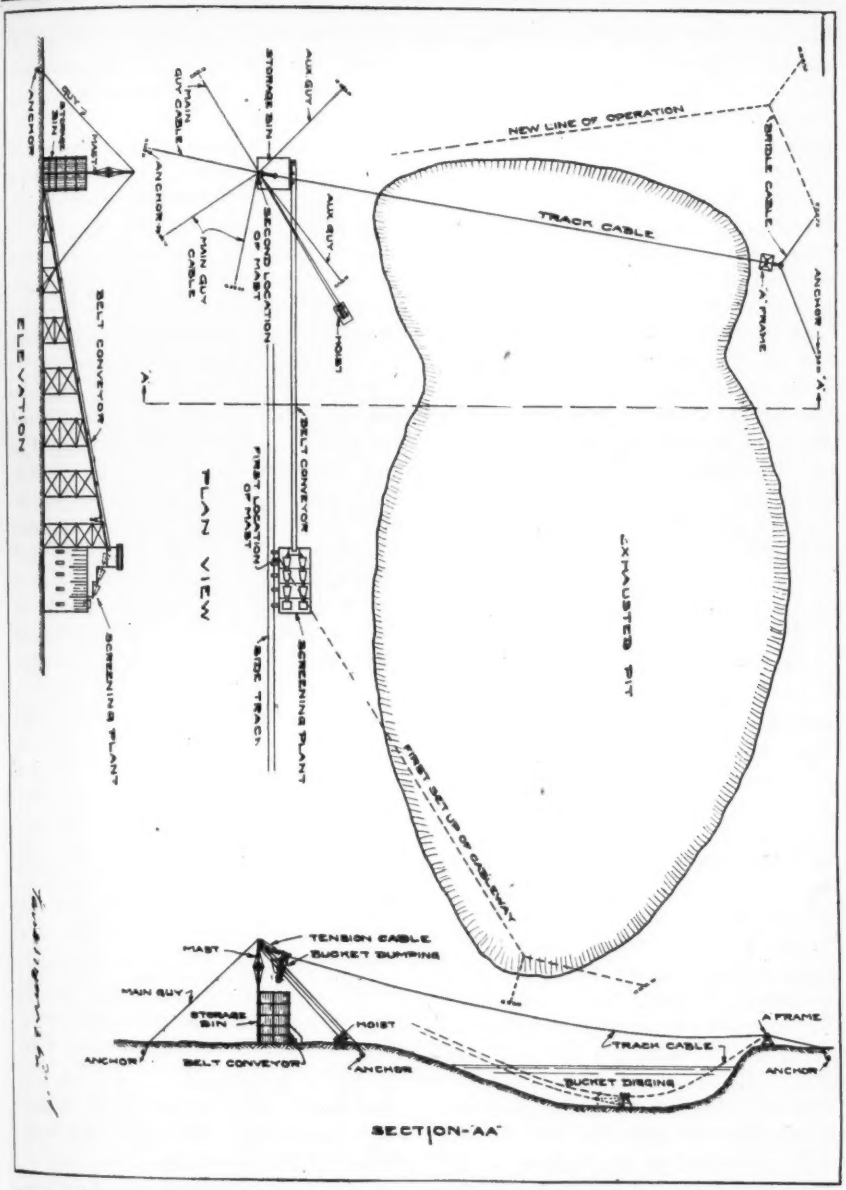
Reaching a New Supply

AS IS WELL known, the long reach of a dragline cableway excavator enables it to operate from the same location for several years and to perform the combined functions of a digger and conveyor in delivering to the screens many hundred thousand cubic yards of material.

In the course of four to eight seasons, however, a dragline cableway excavator will generally exhaust all the usable material within its working radius. What is to be done then?

The accompanying photographs and diagram show what the McGrath Sand & Gravel Company did to meet the situation at their pit at Chillicothe, Ill.

Originally, their 1½-yard Sauerman dragline cableway excavator was located at the washing plant and carried the sand and gravel directly to the screens; but after four years of steady operation, often working day and night, the excavator had taken out all the gravel within its 500-foot



span and to a depth of 80 feet, where the good material ended.

It was at this time that the field storage bin with the 500-foot incline belt conveyor was installed and the Sauerman excavator was reset as illustrated. This gives the cableway a new area of operation practically as large as at its first location, only now it dumps into the storage bin and the sand and gravel is carried from the bin to the screens by the belt conveyor.

The expense of moving the washery and putting in new sidings has been avoided and the efficiency of the plant

has not been impaired. In fact, the remodelled plant in one respect has an advantage over the old plant because the presence of the field bin with its storage capacity of 300 cubic yards of material permits of operating the excavator and the screens independently of each other so that either can be shut down for about one-half day at a time without causing an entire suspension of operations.

At its present setting the outboard end of the cableway about reaches the property line, so the next move will probably be to transfer the entire field equipment — dragline cableway excavator, storage bin and belt conveyor — to the other end of the washery and enlarge the pit in that direction.

Oregon Votes Down State Cement Plant

Refuses to Undertake "Costly Experiment" When Told Commercial Plants Are Not Paying

STATE-OWNED cement plants do not make much of a hit with the house of representatives of Oregon, which fact was made apparent to Representative Scheubel, when his bill authorizing the state highway commission to own and operate paving plants, came up for final consideration.

The consideration of the measure precipitated the one fight of the day, finally resulting in the failure of the bill to pass by a vote of 26 for it, the same number of votes against it and seven absent. It requires 31 votes to pass a measure through the House.

Smith of Baker led the onslaught upon the Scheubel proposal when the bill came up for final consideration. He contended that it would cost $3,000,000 to equip a cement plant ready to operate on a scale sufficient to meet the needs of the commission. He said that it was unwise and a foolish experiment.

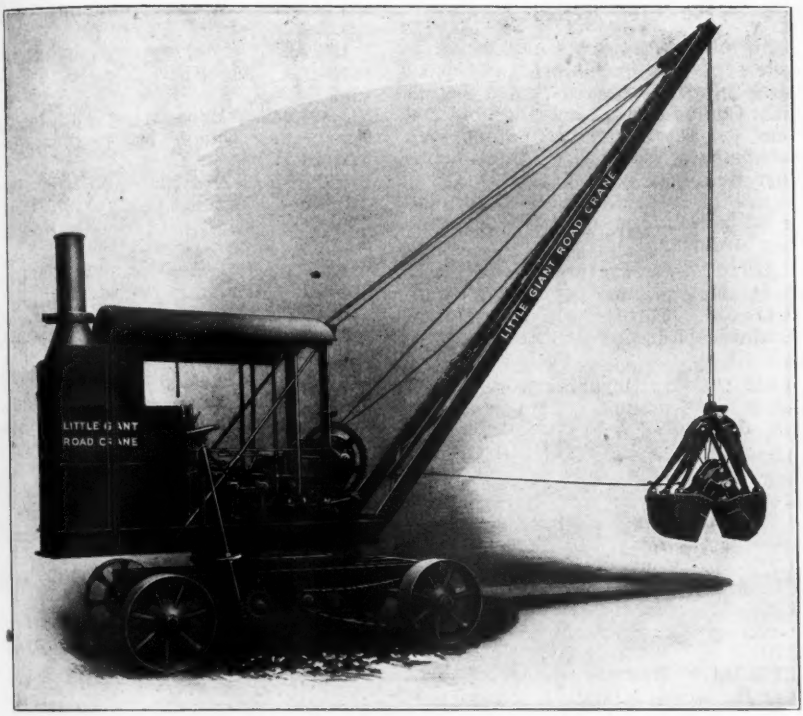
Dennis, chairman of the roads and highways committee, which had given the measure a favorable report, championed it, contending that to give the commission the power to purchase and operate such a plant would result in cheaper materials for the state highway construction work, whether the power were to be used or not.

Dennis said he did not want to charge that there was a cement trust operating in Oregon, but he wanted to call attention to the peculiar circumstance that all the prices quoted for cement by all the different companies were the same. He contended that such a plant in operation would save the state hundreds of thousands of dollars, and pointed to the experience of California and other states in demonstration of what he contended.

Horne took the opposite view. He warned the House that it would be "a very costly experiment" for the state to go into the cement manufacturing business, and said that too many men had gone on the rocks attempting to manufacture cement to permit him to cast his vote to put the state in the business.

Moore also spoke to the same point, telling the house that he was an investor in the Oswego Cement Company, and that it had never paid a dividend.

Scheubel, talking in support of his bill, argued that the state had been paying a big profit at both ends of the highway construction program. The system employed by the state, he contended, has resulted in building up a big contracting organization throughout the state, and that the commission had been confronted with two combinations, the bitulithic paving people on the one hand and the cement on the other.



A Mobile, Self-Contained, Portable Crane

The Little Giant road crane adequately fulfills the need for a mobile crane for the various functions connected with the utilization of such a device in pit and quarry work. And at the same time it is so economical to maintain as to permit of its employment in the smallest class of operations.

Full consideration has been given to the demands made upon this type of apparatus, and out of this consideration has been developed a steam operated road crane, fully equipped with the necessary mechanism for performing by power the work demanded of such a device, that is, of rotating full swing, and traveling, with a complete raising and lowering of the boom.

The hoisting mechanism is capable of operating a ¾-yard clam-shell or a ½-yard orange-peel bucket of the two-line type, or it can be used in handling a fall block with hook. The limitations of the boom length are not exhausted by any reasonable requirement.

The Little Giant road crane may be operated in a small space, for it does not require the use of outriggers or clamps, as it is absolutely impossible to tip the crane when it is in operation, regardless of the position of the carbody or boom.

The construction is of the most substantial kind. The carbody is mounted on two heavy steel axles, on which a specially cast electric steel traction wheel, 36 inches in diameter, with a 14-inch base, revolves. A circular sluing rack is made up of steel castings in two sections and attached to the carbody, so as to withstand all possible mechanical shocks. The roller paths consist of two 20-pound rails, each bent in a complete circle, one being attached to the carbody and one to the turntable. Between these opposing rails, held together by continuous side straps, run 20 anti-friction rotating wheels, which provide a stable and adequate support to the turntable under any and all operating conditions.

The Little Giant road crane is manufactured entirely in the plant of the Locomotive Crane Company of America, Chicago.

Recent Patents

The following patents of interest to readers of this journal recently were issued from the United States Patent office. Copies thereof may be obtained from R. E. Burnham, patent and trade-mark attorney, Continental Trust Building, Washington, D. C., at the rate of 20 cents each. State number of patent and name of inventor when ordering.

1,325,027. Excavating-shovel. Robert H. McWilliams, Memphis, Tenn.

1,325,028. Cutter-chain for mining-machines. Edmund C. Morgan, Chicago, Ill.

1,325,029. Cutting-chain for mining-machines. Edmund C. Morgan, Chicago, Ill.

1,329,030. Cutting-chain for mining-machines. Edmund C. Morgan, Chicago, Ill.

1,325,031. Mining-machine. Edmund C. Morgan, Chicago, Ill.

1,325,055. Conveying system. Francis L. Stuart, New York, N. Y.

1,325,167. Automatic gravity-loader for conveyers. Samuel Olson, Chicago, Ill.

1,325,181. Railway-dump. Alexander H. Wood, Kildav, Ky., assignor to Wood Equipment Co., Chicago, Ill.

1,325,182. Railway-dump. Alexander H. Wood, Kildav, Ky., assignor to Wood Equipment Co., Chicago, Ill.

1,325,183. Railway-dump. Alexander H. Wood, Kildav, Ky., assignor to Wood Equipment Co., Chicago, Ill.

1,325,609. Mining-car. Adolph G. Bauer, Whitewater, Colo.

1,325,610. Mining system. Adolph G. Bauer, Whitewater, Colo.

1,325,812. Apparatus for conveying, delivering and gathering material. Francis L. Stuart, New York, N. Y.

1,325,818. Combination traveling-crane cableway. William van den Heuvel, Los Angeles, Cal.

1,326,255. Mining-car wheel. Alfred B. Day, Oliver Springs, Tenn.

1,326,337. Excavating-machine. Patrick Goodman, New York, N. Y.

1,326,364. Process and apparatus for filling excavations. James C. Meem, Brooklyn, N. Y.

1,326,480. Tunneling-machine. Frank L. Dana, Houston, Tex.

1,326,649. Mining-car wheel. Alfred B. Day, Oliver Springs, Tenn.

1,326,825. Pneumatic rock-drilling machine. Gustaf Anderson, Stockholm, Sweden.

1,326,839. Mine-car coupling. John A. Bish, Showers, Pa.

1,327,052. Coal mining and loading machine. Jacob M. London, Tunnelton, Pa.

1,327,053. Excavating and loading apparatus. Jacob M. London, Tunnelton, Pa.

1,327,071. Hoisting and conveying machine. Ernest W. Taylor, Cleveland, O., assignor to Brown Hoisting Machinery Co., same place.

1,327,255. Dump-car. William B. Reynolds, Roundup, Mont.

1,327,324. Loading and unloading apparatus. Arthur S. Hecker, Cleveland, Ohio.

1,327,452. Suction-nozzle and material-separator for reducing-machines. Milton F. Williams, St. Louis, Mo., assignor to Williams Patent Crusher & Pulverizer Co., same place.

1,327,623. Dump-car. Thomas R. McKnight, Aurora, Ill., assignor to Western Wheeled Scraper Co., same place.

1,328,013. Excavating-shovel. John W. Page, Chicago, Ill.

1,328,118. Tunneling-machine. Ingebret Bohn, Sorumsanden, Norway.

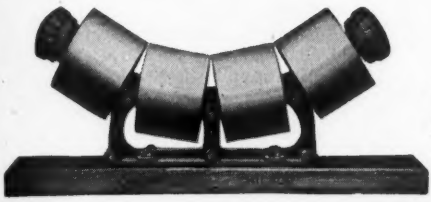
District Engineer for Traylor

Mr. Ben Haislip who for the past four years has been connected with the Chicago office of the U. S. Rubber Company as sales engineer, on January 1, 1920, joined the sales organization of the Traylor Engineering & Manufacturing Co. of Allentown, Pa., makers of the famous "Bulldog" jaw and gyratory crushers, Traylor heavy duty crushing rolls, and complete cement mill and smelting plant equipment.

Mr. Haislip, who from 1904 to 1905 was with the Allis-Chalmers Company, and from 1905 to 1916 with the Power & Mining Machinery Company, will be connected with the Chicago district office, 1414 Fisher building, of the Traylor company, in the capacity of sales engineer and assistant to Mr. L. J. Hewes, district manager.

Hugo L. Siegel, formerly general sales manager for the Ford Roofing Products Company, is now with Walter A. Zelnicker Supply Company, St. Louis, Mo., as assistant to the president.

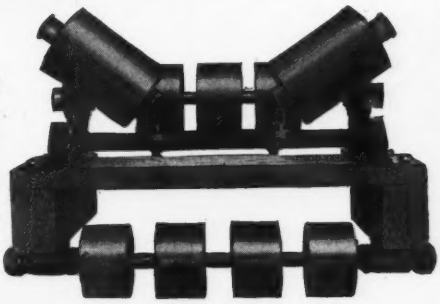
CALDWELL CONVEYORS

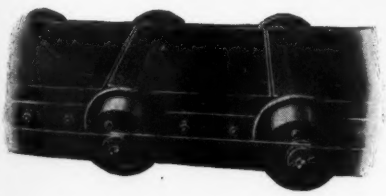


BELT CONVEYORS

Simple in design, economical of power, they give satisfaction. Different styles to suit your requirements.

A rough sketch showing conditions to be met at your plant, with capacity desired and power available, will bring our recommendations.





APRON OR PAN CONVEYORS

Flights or pans made of steel or cast iron, fitted to steel bushed self-oiling roller chain — complete with drives.

SCREW CONVEYORS

Steel "HELICOID" or Sectional flight screw conveyor for washing plants. We also make cast iron Screw Conveyors.

See Catalogue No. 38 for complete line of

Elevating, Conveying and Power Transmitting Machinery

H. W. CALDWELL & SON COMPANY
CHICAGO
Western Avenue, 17th and 18th Streets

New Type of Dryer

A Pennsylvania manufacturer has produced a drying machine which is declared to be 65 to 88 per cent efficient. It consists of a revolving drum, in which the material to be dried is completely surrounded by hot gases from a furnace, and in some instances mixed with them.

These gases first heat the entering end of the drum, pass through flues into the inner cylinder, and out the opposite end; then back through the annular space, the material being tumbled by means of plates on the cylinder walls as the drum revolves, and in this way is mixed with the hot gases and dried.

One type of machine is so arranged that the gases do not touch the material, but hug the outer and inner walls of the cylinder.

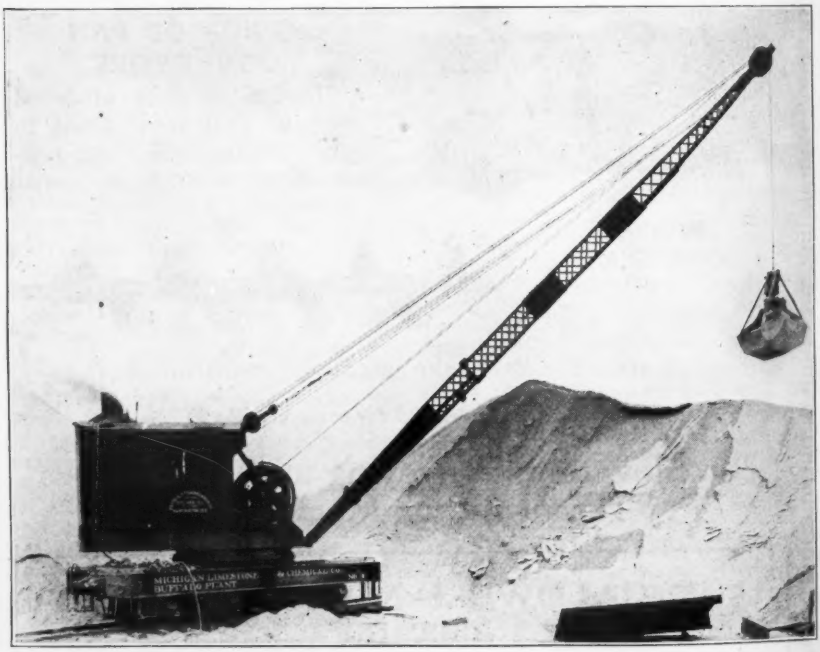
After the hot gases have done their work, they are taken into the exhaust pipe by means of a suction fan, having given up nearly all their heat without waste.

Ideal Engine Co. Opens New Chicago Office

The Ideal Engine Company, manufacturers of gasoline engines, hoists, pumps, and contractors' equipment; and the Ideal Power Lawn Mower Company, manufacturers of power lawn mowers, announce the opening on January first of their branch office and sales rooms at 533 South Dearborn street, Chicago, Ill.

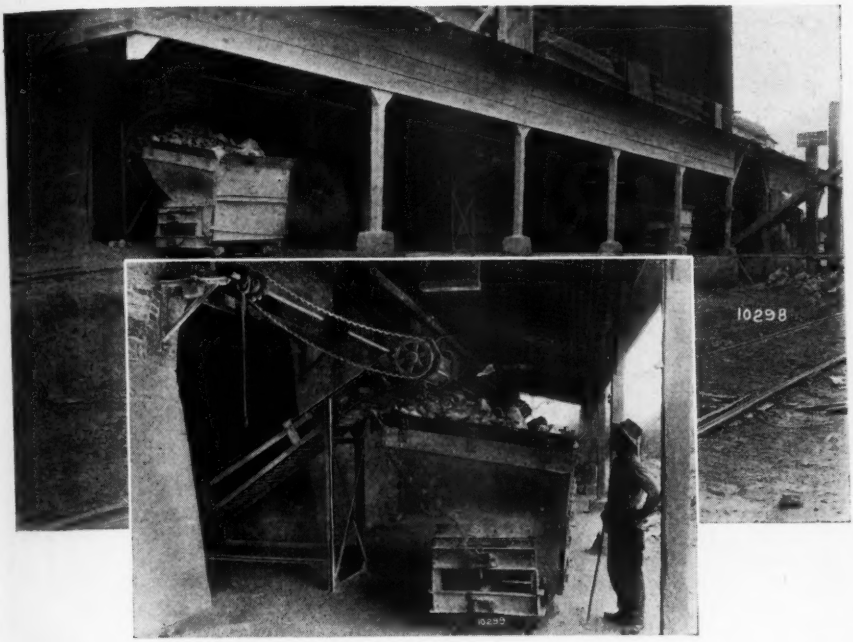
The Chicago office will be under the management of Mr. E. H. Peters, who will be very glad to see that your requirements are promptly taken care of.

The Barry Sand & Gravel Company, Barry, Ill., has sold its equipment to the Decatur Sand & Gravel Company, and are installing new machinery, etc., in order to take care of the increased demand for their product. They are installing a new drag-line outfit to take the place of the centrifugal pump formerly used. The new plant will be operated by electricity.



Scene in the Buffalo plant of the Michigan Limestone & Chemical Co., showing operation of Orton & Steinbrenner locomotive crane, equipped with 60-foot boom and one-half-yard clam-shell bucket.

Drawing Lime from Kilns to Cars



AN example of what Link-Belt Labor-Saving Machinery can accomplish in a lime plant is illustrated by the equipment shown by the above pictures which we recently furnished to the Merion Lime & Stone Co., Norristown, Penna.

This is a low-priced, economical installation consisting of a few simple self-contained, all-steel pan conveyors which handle the lime from kilns to cars. The entire plant is operated by a 5 H. P. motor by means of jaw clutches from a low-speed lineshaft.

The entire row of kilns are drawn with only two men—night shift, and two, day. You know what this means in the reduction of labor costs alone.

The entire equipment will pay for itself in one season. While the arrangement of this installation is typical, modifications can be easily made to take care of almost any conditions. Why not investigate? Get in touch with us today.

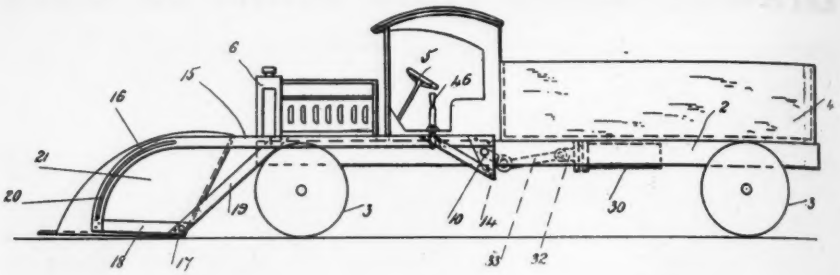
LINK-BELT COMPANY

Philadelphia, Hunting Park Ave. and P. & R. Ry. **Chicago, 329 W. 39th St.**

Offices in all principal cities

LINK-BELT

Lime Handling Machinery



New Loading Device

The above drawing shows a power shovel recently patented by E. L. Beaty, Statesville, N. C., and assigned in part to the Carolina Motor Company, of that city.

It will be noted that the device consists of a shovel pivoted to a motor truck in such fashion that it can be let down in front of the truck and driven into a pile of sand or other material.

The shovel can then be raised up and swung completely over to the back of the truck and dumped into the body, the shovel being so hung as to maintain an upright position until it is ready to be dumped.

Enlarging Plant

The Link-Belt Company finds it necessary to enlarge its plant, the Belmont Foundry, at Indianapolis, in order to take care of the constantly increasing demand for Link-Belt malleable iron chains for elevating, conveying and power transmission purposes.

They are putting up two new furnace buildings—numbers 7 and 8—although only the former will be installed at present. This will be 15-ton capacity instead of 10-ton like their present furnaces.

They are also purchasing the necessary machinery, such as rolling mills, sand blast, and other foundry equipment needed to take care of the additional capacity.

The building will be about 70 feet wide by 400 feet long, and when finished will complete the foundry as originally laid out.

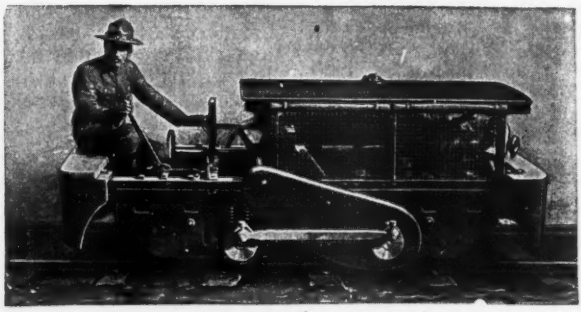
Portable Conveyor

The illustration herewith shows how a portable conveyor can be used to load truck cars with coal for supplying a power plant.

These conveyors, which are built by the Portable Manufacturing Company, Passaic, N. J., have been used in a variety of ways, including their use in a series of from two to five conveyors, delivering from one to another to transport materials for some distance.

They are also used to advantage to unload hopper bottom cars, because of the fact that no track hopper or pit is necessary.

To unload a car, the scoop or feed end of the machine is placed near or under the car hopper. The hopper door is then released and the belt on the scoop conveyor carries the material away as fast as it flows through the hopper opening.



Just the thing for Your Plant!

The Bell Gasoline Locomotive

Note What a U. S. Motor Transport Officer Says of It:

File No. 451.3

OFFICE OF THE QUARTERMASTER
FORT WOOD
New York Harbor

October 28, 1919.

To: Bell Locomotive Works, Inc.,
23 Water Street, New York.

Subject: Narrow Gauge Locomotive.

1. In reference to your inquiry, this office wishes to advise that the service rendered by the special narrow gauge locomotive built by your firm for this Post has been entirely satisfactory.

2. This machine was built by your firm on a rush order and it has proven itself worthy in simplicity and dependability of operation.

3. There has never been an engineer assigned to the operation of this machine, anyone who happened to be available having been assigned to run it. Even under these circumstances, the engine has given maximum service.

(Signed) Christian Wahl,
Major Signal Corps,
Acting Motor Transport Officer.

In your pit or quarry, you will find an outfit like this, run on narrow gauge rails, a means of greatly speeding up the production and delivery of your entire plant. These locomotives are of the internal combustion, friction-driven type, and made in 2, 3 and 4-ton sizes for any gauge 18 inches or over.

Write for literature, stating requirements.

BELL LOCOMOTIVE WORKS, Inc.

23 Water Street **NEW YORK**

Send for bulletin 133 covering our oil burning steam locomotives.

Sharing Its Experience

Announcement is made by the Greenville Gravel Company of Greenville, Ohio, of a new policy for 1920, which is of more than passing interest.

This company operates eleven sand and gravel washing, screening and crushing plants in five states having an aggregate capacity of 6,000,000 tons a year, and it operates and maintains a department known as the Greenville Mfg. Company equipped with a modern factory and an engineering department.

The company states that in late years it has been frequently solicited by other producers and by other persons investing in enterprises similar to the gravel industry for engineering suggestions and assistance. This practice finally became so common that the company determined to augment its present engineering department so as to enable it to more fully accommodate its friends in this particular.

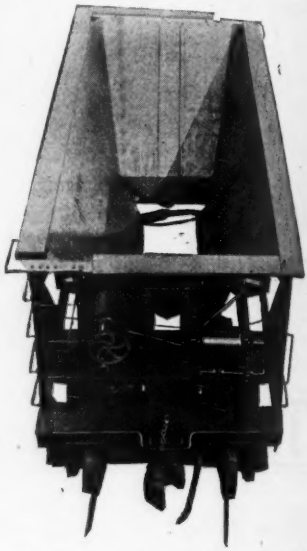
To that end the company announces that it is prepared to share with the public its 17 years' successful gravel plant operation and expensive experimental work by placing at the disposal of all the services of its engineering department. After January 1, 1920, it offers to furnish experienced engineers to inspect prospective plant sites, design and equip plants and furnish erection supervision.

National Dump Cars

Sand and gravel men, and also quarry men handling crushed rock, will find a remarkably efficient labor saving piece of equipment in the center-dumping National dump car. These cars were first built to meet an emergency on the Missabe range, and designed to carry 50 tons of iron ore. This red ore in limitless quantities is mined with steam shovels and loaded into the cars just like earth, 5 yards with every dipper full. This required a car that would withstand the shock of the dropping ore and a hopper door and door-operating mechanism that would both carry the load and prevent leakage, for iron ore is valuable.

The door-operating mechanism is a novel feature, designed on the principle of a jackknife lever, so that the greater the load the more securely it locks automatically, yet can be easily tripped and dumped.

The ore is carried many miles in these cars to the great docks at Duluth and Ashland and even to Escanaba, where the doors are tripped and the ore dumped into the holds of the great whaleback ore boats, and carried to South Chicago, Gary, Ashtabula, etc., while the cars return to



the range for another load. The millions of tons moved, particularly under the excitement of high pressure production during the war, have proved this car the perfect car. Wherever it has been used in sand or gravel or crushed rock, it has been equally successful, always carrying its load securely, without loss and discharging it instantly and completely when dumped.

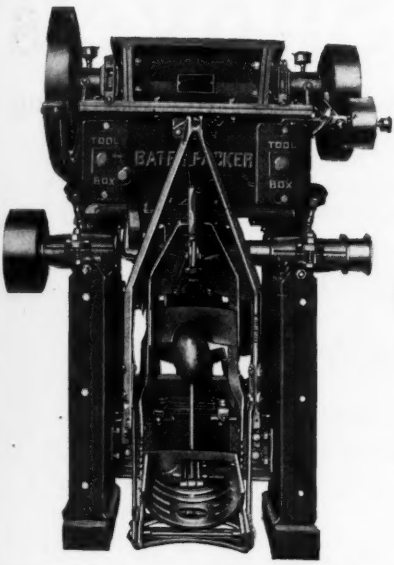
They can be furnished to suit any gauge of track and to carry any required number of yards. In fact, they are so flexible that they can be made to suit almost every condition or requirement.

New Chicago Office

The John F. Byers Machine Company, Ravenna, Ohio, announces the opening of their new Chicago office, 20 West Jackson boulevard, in charge of Mr. E. L. Kelzer, in order to render mechanical and sales service to their growing clientele on the Byers Auto-Cranes and hoisting engines.

The Ladd Lime & Stone Company, of Cartersville, Ga., has recently joined the National Lime Association.

BATES BAG FILLING MACHINE



Less Labor
Greater Output
Reduced Cost

Used universally for packing pulverized rock products.

Bates Valve Bag Company
7310 South Chicago Ave.
Chicago, Ill.

They make good Belts give better SERVICE

They save time, labor & Belting

They insure Continuous Production

They do not cut out, punch, tear or injure the belt

They insure full power Transmission

They sustain the belt's full strength

CRESCENT BELT FASTENERS

"Make Good Belts Give Better Service."

CRESCENT BELT FASTENER COMPANY 381 FOURTH AVENUE NEW YORK
BRANCHES BIRMINGHAM ENGLAND TORONTO CANADA DISTRIBUTORS THROUGHOUT THE WORLD

Steam Shovels

Special attention is called to the following thoroughly overhauled shovels.

1—Model 0 Thew, shop number 1084.

2—Marion 60 Steam Shovels with 2½ yard dipper, Shop Nos. 1995 and 2059.

LOCOMOTIVES

1—Fate 3-ton Gasoline Locomotive.

1—60 ton, 18x24, six wheel Switching Locomotive, standard gauge, 150-lb. pressure, INTERSTATE Certificate.

1—36 ton, 14x20, H. K. Porter Saddle Tank Locomotive, standard gauge.

6—18 ton, 10x16, H. K. Porter Dinkeys, 36″ gauge.

CARS

40—12 yard capacity Western, standard gauge air dump cars, 19′ beds.

30—12 yard capacity Western, standard gauge air dump cars, 26′ beds.

CABLEWAY

1—3 ton capacity Lidgerwood Cableway 1164′ span, complete with Lidgerwood 9x10 Cableway engine.

In addition to the above, we have a large stock of contractors' construction equipment of various classes.

H. Kleinhans Company Union Arcade, Pittsburgh, Pa.

WE BUY—
REBUILD—
SELL OR RENT

CONTRACTORS EQUIPMENT

AIR COMPRESSORS

7—Chicago Pneumatic Tool Co.'s class N S G L T M, 133 cu. ft. with gasoline engine, like new, with tank, on trucks.

BACK FILLERS

4—Austin gasoline back fillers with caterpillar traction, boom type.

LOCOMOTIVE CRANES

2—15 Ton Brown hoist locomotive cranes, 8 wheel, MCB construction, with 50 ft. lattice boom, bucket handling, like new.

1—25 ton Industrial 8 wheel MCB construction, with 45 ft. boom.

HOISTING ENGINES

1—10x12 Flory DC, 3D, with attached swinger and butt strap boiler.

1—10x12 Lidgerwood, DC, DD, skeleton.

2—8¼x10 American, DC, 3D, with boiler.

1—7x10 Lidgerwood, DC, DD, with boiler.

1—9x10 Lambert, DC, DD, with boiler.

1—Mundy 3 drum with attached swinging gear arranged for motor drive but without motor.

23—Various makes and sizes.

LOADERS

5—Jeffery No. 15A gasoline driven, self propelling wagon loaders.

2—Haiss gasoline driven, self propelling wagon loaders.

STEAM SHOVELS

2—Type B Erie fully revolving ¾ yd. dipper, traction wheels.

3—Type O Thew, fully revolving, ⅝ yd. dipper, traction wheels.

1—175-B Bucyrus, 75-ft. boom, 3½ yd. dipper.

1—Model 60 Marion, standard gauge, MCB equipped.

DERRICKS

5—Stiff leg with 60-ft. booms, arranged for bucket handling.

1—All steel Guy Derrick, Mast 76 ft., boom 66 ft, with bull wheel capacity 25 tons.

CARS

15—24-in. gauge Koppel V-shaped, 1 yd. side dump cars.

35—36-in. gauge 4-yd. Western side dump cars.

12—12 yd. standard gauge, side dump.

TRACK

12,000 lineal feet 24 in. gauge, 20 lb. with steel ties.

6,500 lineal feet, 24 in. gauge, 16 lb., with steel ties.

TRENCHING MACHINE

1—Buckeye No. 4 wheel type with gasoline engine and caterpillar traction.

These are only a few items of the equipment we own. If you do not find what you want, write or wire us your requirements.

We are in the market for used equipment of all kinds. Write us, giving full description and price

Equipment Corporation of America

Land Title Building Philadelphia, Pa.

Lumber Exchange Building **Chicago, Illinois**

Empire Building Pittsburgh, Pa.

MARSH'S
Quarry Specialties
GUARANTEED

BUCKETS

1—1 yd. Orange Peel.....$ 300
1—1-yd. Dragline, Page..... 300
2—1-yd. Concrete at $50 each..... 100
1—1½-yd. McMyler (new)..... 500
3—2-yd. Brown Hoist at $500 each. 1,500

BOILERS

1—200 H.P. Scotch Marine 2,000
1— 30 H.P. Upright 200
1— 15 H.P. Upright 100
1— 60 H.P. Upright 800
1— 50 H.P. Upright 700
2— 60 H.P. Erie Economic at $750 each 1,500

CRUSHERS

1—No. 12 Gates Style K manganese fitted nickel steel shaft (almost new) 8,000
1—No. 7½ Austin Gyratory..... 2,500
2—20x24 Blake, each..... 2,000
1—No. 4 Gates Gyratory..... 1,000
1—10x20 Blake 750

COMPRESSORS

1—Rand Imperial Duplex, cap. 1,500 ft. 2,000
1—Ingersoll, 2-stage, air, belt drive, 600 ft. 1,000

DIPPER

1—2¼-yd. Bucyrus 500
1—¾-yd. Browning with boom and engine (new) 750

DRILLS

8—Chicago Pneumatic Tool Co. 3¼ in. drills, each..... 100

DERRICKS

1—5-ton Stiff Leg with steel bull wheel 500
1—2-ton Stiff Leg..... 200

ENGINES

1—150 H.P. Atlas Automatic.....$ 750
1—200 H.P. Allis-Chalmers Corliss. 1,250
1— 20 H.P. Erie Center Crank..... 200
1— 70 H.P. Erie Center Crank..... 300
1— 15 H.P. Keystone Reversible... 250
1—Westinghouse 250
1—150 H.P. Stillwell Bierce..... 150

HOISTING ENGINES

2—6¼x10 American Hoist and Derrick with boiler at $750 each.... 1,500
2—6x8 Contractors' Plant Co. S. C. S. D., at $200 each..... 400
1—8x12 Lidgerwood D. C. D. D.... 500
1—12x14 Special Dragline, 90 H.P. (new) 1,500
1—9x10 D. C., 3-drum Cableway Engine 1,500

LOCOMOTIVES

1—Vulcan 36-in. gauge Saddle Tank 1,000
1—Porter Standard Gauge Saddle Tank, 14 tons..... 2,000

PUMPS

1—No. 5 Pulsometer..... 100
1—Wilson-Snyder Water Works, 3,000,000 gals. per day..... 1,500

ROLLERS

1—10-ton Steam Roller..... 1,000

SCREENS

1—42-in. by 14-ft. Screen complete.. 400
2—Stephens & Adamson at $150 each 300

SHOVELS

1—Model 28 Marion Traction, fine.. 4,700
1—Vulcan-Bucyrus Revolving Shovel, standard gauge, perfect..... 3,250
1—70 C. Bucyrus with standard, also stripping booms and dippers.....11,000

We Own All of the Above and Guarantee Every Item to Be Exactly as Represented

Write, Wire or Telephone at Our Expense

Machinery Sales Company

Successors to

GEORGE C. MARSH & CO.

Contractors' & Railway Equipment

Telephone Harrison 6904

General Offices

744 Old Colony Building, CHICAGO

CRUSHING PLANTS
STEAM SHOVELS
LOCOMOTIVE CRANES
LOCOMOTIVES
QUARRY CARS
ELEVATORS
SCREENS
STEEL DUMP CARS
CLAM SHELL BUCKETS

HOISTING ENGINES
AIR COMPRESSORS
TRENCH MACHINES
DRAG LINE EXCAVATORS
STEAM ROLLERS
CABLEWAYS
CONCRETE MIXERS
BOILERS
ENGINES

FOR SALE

DRAGLINES

1 No. 1, T Monighan Dragline Walker, Shop No. 233. New Monighan engine, forty-foot boom, one-yard Page bucket. Delco starting and lighting plant. Located, Winchester, Ill.

1 No. 2, Monighan Steam Dragline Skids and Rollers and Trucks. Sixty-foot boom, 2½-yard Page bucket, 10x10 Main engines, 7x10 swinging engines, locomotive type boiler. Immediate delivery.

SHOVELS

1 No. 0, Thew full revolving traction shovel, ⅝-yard dipper, Ohio boiler, Shop No. 1139.
2 No. 0, Thew full revolving traction steam shovels. First class condition. Immediate delivery. Shop No. 1047, Ohio Boiler, ⅝-yard dipper.

CRUSHERS

1 No. 6K Gates gyratory crusher. Straight drive, excellent condition.
1 No. 4 McCulley crusher, straight drive.

SCREENS

1 42 in. by 16 ft. revolving screen.
1 Austin 48 in. by 16 ft. revolving screen.
1 Gates 40 in. by 14 ft. revolving screen.

ELEVATORS

1 42 ft. center Gates elevator, complete, 18 in. belt.
1 57 ft center Austin elevator, complete, 18 in. belt.

HOISTING ENGINE

1 7 by 10 O. & S., D. D. D. C. Hoist, with boiler stack and all fittings.

COOLEY BROS.

456 Old Colony Bldg. Chicago, Ill.

Full Revolving Self-Propelling

LOCOMOTIVE CRANES

Mounted on Traction Road Wheels, Equipped With 30 ft. Booms and ¾ yd. Clamshell Buckets

ALL BRAND NEW

F. MAYER

737 Monadnock Bldg. Chicago, Ill.

Contractors' Equipment of all Kinds

SELECT HERE

SHOVELS

1—Model 175 Bucyrus, A-1 condition, immediate delivery.
1—Model 75 Marion standard, special build. A bargain.
1—Thew, type 4, on railroad trucks, 1½-yd. dipper.
1—Thew, type 0, ¾ yd. Traction wheels, immediate delivery.
1—Thew, type A-1, ⅞ yd. bucket, horizontal crowd.
1—Bucyrus, Atlantic type, 2½ yd. bucket, fair shape.
2—Bucyrus, one type C, other a standard, both with 2½-yd. dippers. Both in excellent condition. Immediate delivery.

DRAGLINES

2—Monighan No. 2 with 2-yd. Page buckets, 60′ steel booms, skid and roller type.
1—Marion, model 228 with 2-yd. bucket and 90′ boom.
1—Locomotive crane and dragline on railroad trucks with 2-yd. bucket and 80′ steel boom. Excellent shape.
2—Monighan, type 3T, one a walker, other rollers attached to base, both with 60′ booms, one a 3-yd. other a 4-yd.
1—Monighan, type A, one yard on trucks. In good repair.

LOCOMOTIVES

2—Standard gauge switches, one a Hinckley, other a Rogers, type 040 with tenders. Several others in standard 36″ and 24″ gauge.

CARS

14—12-yard Western dump cars steel underframe, air dump.
6—6 cubic yard steel standard guage side dump cars.
2—Gondolas, standard guage with removable sides and ends.
4—34′, standard gauge, 60,000 lbs. capacity, neither bottom or side dump.

Many others in all guages and types. This is but a partial list of these items. We have all kinds of equipment needed for both pit and quarry—crushers, elevators, boilers, engines and etc.

WRITE AND TELL US WHAT YOU NEED NOW.

Leonard P. Smith & Company
604 Citizens National Bank Bldg.
South Bend **Indiana**

OIL ENGINES

Slightly Used—Prompt Delivery

60 H.P. Fairbanks Morse
50 H.P. Metz & Weiss
50 H.P. Fairbanks Morse
40 H.P. Fairbanks Morse
25 H.P. Fairbanks Morse
20 H.P. Fairbanks Morse

50 various sizes of other makes.

A. H. McDONALD
548 W. Monroe St. Chicago, Ill.

STANDARD GAUGE LOCOMOTIVES

1—50 & 1 34-ton 4-driver saddle-tanks.
1—40-ton 17x24″ four-wheel switcher.
2—50-ton 18x24″ six-wheel switchers.
1—9x14 & 2 7x12—36″ gauge steel.
30 1½-yd. 36″ gauge dump cars.
1—Western standard gauge spreader.
1—Model 76 Marion steam shovel, No. 3503.
1—Class 14 Bucyrus drag-lines, 65 ft. boom, 2-yd. bucket, Nos. 733.
2—1-yd. Foote concrete mixers with 20 H. P. boiler.

Locomotive-cranes, steam shovels, narrow and standard gauge cars, etc.

INDUSTRIAL EQUIPMENT CO.,
McCormick Bldg. Chicago, Ill.

FOR SALE

Sand and Gravel Pumping Outfit

complete, consisting of 10-inch Morris Pump, direct connected to 9x9 in. Double Engines; 125 H. P. Boiler; Dake one drum Hoist. All in splendid condition and priced right. Are installing electric power.

The Lincoln Sand and Gravel Co.
Lincoln, Illinois

FOR SALE

One Thew Automatic Steam Shovel, Model "O," No. 617, in first class condition. Can be inspected under operation.

Thomasville Stone & Lime Co.
Thomasville Pa.

FOR SALE

One ⅞-yd. Coal Loading Dipper for Marion 28 Steam Shovel, in excellent condition.

FRED R. JONES CO.
139 N. Clark St. Chicago

FOR SALE

3—No. 6 Williams swing hammer mills.
2—No. S-5 Pennsylvania swing hammer mills.
All in good condition.

Address Box 133,
PIT & QUARRY
538 S. Clark St., Chicago, Ill.

FOR SALE

CRANES

1—30-40 ton Browning—50-foot Boom
1—35 ton McMyler —50-foot Boom
1—25 ton Industrial—50-foot Boom
1—25 ton Industrial—45-foot Boom
1—20 ton Industrial—45-foot Boom, 15-foot Extension
1—17 ton Industrial—50-foot Boom
1—12 ton Industrial—38-foot Boom, equipped with magnet

SHOVELS

2—70 C Bucyrus R R Type—2½ yard Dipper
1 60 Marion RR Type—2½ yard Dipper
1 60 Marion RR Type—1¾ yard Dipper
1 No. 1 Thew Traction Type—1 yard Dipper
2 No. 0 Thew Traction Type—¾ yard Dipper.

LOCOMOTIVES

1—9x14 Davenport Saddle Tanks S.G.
1—9x16 Davenport Saddle Tanks S.G.

CARS

16—6 yard Continental two way dump cars Standard gauge
90—12 yard All steel Western two way Standard gauge dump cars
26—20 yard All steel Western two way Standard gauge dump cars

RAILWAY MOTOR CAR CO. OF AMERICA
110 S. Dearborn St. **CHICAGO**

MACHINERY—For Sale—DERRICKS

Road Roller—8-ton Wheeling tandem, A-1 shape; price $1,800.00.
Road Rollers—5 and 10-ton.
We have on hand 5 Road Paving Concrete Mixers, Koehring-Foote-Municipal

10 Barnes Force Pumps with Novo Gasoline Engines, 225-lb. pressure. Pumps 1,500 gallons per hour through 20,000 feet of 2-inch pipe, 3"x5" and 4"x5"..

STEAM BOILERS

50 H.P. vertical boiler.
125 H.P. firebox boiler, Butt Strap.
70 H.P. Erie Economic boiler.

7x10 Lidgerwood D. C. swinging or car pulling hoisting engine.
7x10 double drum double cylinder hoisting engine.
6¼x8 double drum, double cylinder hoisting engine.
8¼x10 three drum, double cylinder hoisting engine.
Clam Shell Buckets, ½, ¾ and 1 yard.
Channon Drag scraper Bucket.

Hayward Orange Peel Bucket 1½ yard.
Vulcan Pile Hammers, Steam and Drop.
Steam Rock Drills, Sullivan-Ingersoll.
Air Compressors, all sizes.
Pulsometer and Nye Steam Pumps.
Centrifugal Water Pumps.
Pulleys and Shafting, all sizes.
Friction Hoisting Drums.
Wire Rope Sheaves, Blocks and Bronze Bushings for Sheaves.

Big lot of wide elevator and conveyor belting.
Lot of 15-in. steel elevator buckets.
All kinds of pipe and steel rails.

The above is just a partial list of what we have. We are offering for sale over $500,000 worth of all kinds of good used machinery of every kind such as you need, and we can save you a lot of money on your requirements. We also manufacture a full line of steel and wooden derricks, portable derricks, portable clam shell bucket cranes, cableways, drag scraper outfits, screens, elevators, hoisting engines, gasoline engines, pumps, steam boilers, smoke stacks, Koppel cars, steel rails, crushers, Barge Derricks.

Write to us. We know what we are doing, can save you money and give you the quickest shipment of any manufacturer.

Wilson Machinery Company

Telephone Yards 352 301-331 West 35th Street, Chicago

HOISTS

4—5x8 National Swinging Engines (New).
1—6¼x8 d.c. d.d. & Boiler Lidgerwood.
2—7x10 d.c. d.d. Nationals (New).
1—7½x10, d.c. d.d. & Boiler Lambert.
1—8¼x10, d.c. d.d. & Swinger Lidgerwood.
2—9x10, d.c. d.d. & Swinger Lidgerwood.
1—10½x12, d.c d.d. & Swinger Lambert.

DERRICKS

1—15 ton, 80' boom Lambert Steel Stiff Leg Derrick, for bucket operation, with one 45 degree stiff leg and one full circle stiff leg, allowing 360 degree swing. Just the Derrick for permanent installation on end of pier or storage yard.
5—15 ton 100' boom American Steel Guy Derricks with bull wheels.

BUCKETS AND SKIPS

1—1 cu. yd. Blaw Bull Dog.
1—1¼ cu. yd. Hayward clam shell (ore bowl).
1—1½ yd. Mead-Morrison Clam Shell.
25—4 cu. yd. extra heavy steel skips.

CRUSHERS

1—No. 5 Style "K" Gates Gyratory.
1—No. 7½ Style "K" Gates Gyratory.
1—No. 21 Style "K" Gates Gyratory.
1—60x84" Power & Mining Superior Jaw.

LOCOMOTIVES (Standard Gage)

2—12x18, 4 wh. Saddle Tank American.
3—13x18, 4 wh. Saddle Tank American.
1—14x22, 4 wh. Saddle Tank American.
1—17x24, 6 wh. Saddle Tank Baldwin.

STEAM SHOVELS

1— 70-C Bucyrus 2 yd. dipper.
1— 95-C Bucyrus 3½ yd. dipper.
1—100-C Bucyrus 3½ yd. dipper.

CARS (Standard Gage)

40—12 yd. Western Wheeled Air Dump.

SAND ROLLS

2—40x15 in. "Anaconda" Sand Rolls.
3—54x24 in. "Anaconda" Sand Rolls.

T. H. LETSON CO.

Hudson Terminal Bldg., New York, N. Y.

FOR SALE

AIR COMPRESSORS

1—28¼ and 17¼x14 Ingersoll Belt, 1,671 ft.
1—19 and 12x16 Ingersoll Belt, 888 ft.
2—21 and 13x16 Hall Belt, 850 ft.
1—19 and 12x14 Chicago Belt, 690 ft.
1—12x12 Chicago Duplex Belt, 470 ft.
1—12¼x12 Ingersoll Single Belt, 310 ft.
1—13¼x12 Ingersoll Single Belt, 236 ft.
1—10x10 American Single Belt, 225 ft.
1—10x10 Sullivan Single Belt, 213 ft.
1—8x8 Chicago Single Belt, 116 ft.
1—6x6 Chicago Single Belt, 54 ft.
1—150 ft. Sullivan Gasoline Driven, portable.
1—16 and 28x15 and 25x30 Steam, 2,000 ft.
1—24x24¼x30 Steam, 1,223 ft.
1—10x17 and 12x12 Steam, 741 ft.
1—16x16¼x18 Steam, 550 ft.
1—10x16 and 10x14 Steam, 537 ft.

HOISTS

1—12x12 D. C. 3 D. Stroudsburg.
1—12x14 D. C. S. D. Lambert.
1—10½x12 D. C. S. D. Lambert.
1—10x12 D. C. D. D. Lidgerwood.
1—10x12 D. C. S. D. Flory, 2 speed.
2—10x12 D. C. D. D. Flory.
2—10x12 D. C. S. D. Exeter.
1—10x12 D. C. S. D. Pittson.
1—10x12 D. C. S. D. Flory, link motion.
1—9x10 D. C. S. D. Mead-Morrison.
1—8½x12 D. C. S. D. Filer & Stowell.
1—8¼x10 D. C. S. D. Lidgerwood.
1—7x10 D. C. S. D. Flory.

BOILERS

1—125 H. P. Erie "Economic," Ohio Standard.
2—100 H. P. Locomotive type.
4— 80 H. P. Locomotive type.
Vertical, H. R. T. and Water Tube Steam Shovels, Locomotives, Cars, Derricks, Crushers, Locomotive Cranes, Concrete Mixers and Pavers, Road Rollers, Conveyors, Belting, etc.

Send us your inquiries.

W. E. KENNEDY CO.

Union Bank Bldg., Pittsburgh, Pa.

WANTED

Derrick and Clam Shell

One full circle guy derrick, mast 70 ft., boom 60 ft., and a one-yard clam-shell bucket. Outfit to unload crushed stone and sand into storage piles. Give full description, condition and price of what you have close to these dimensions.

Western Brick & Supply Co.

221 N. 12th St. Lincoln, Neb.

LOCOMOTIVE CRANES

1—8 wheel, 9-ton Industrial with 35-ft. curved boom and ¾-yard bucket.

1—8 wheel, 10-ton Industrial with 45-ft. boom and 1-yard bucket.

1—8 wheel, 20-ton Industrial with 45-ft. boom and 15-ft. extension and 1-yard bucket.

All are MCB, steel under frame, 24 ft. steel bunks and located in Chicago. Large crane rebuilt and ready for immediate delivery. Small cranes ready for delivery February 1.

Machinery Warehouse Co., Inc.
1405 West 37th St. Chicago, Ill.

WANTED

Road Roller, Paver, Crane, Industrial Track and complete equipment for road job.

M. J. Hennessey, 1604 Boatmen's Bank Bldg., St. Louis, Mo.

WANTED

Man experienced and capable operating small sand dredging plant and installing modern equipment. Permanent position; good pay; pleasant and healthy surroundings. Plant located within city. B. B. TAYLOR, Macon, Ga.

BUY OUR GUARANTEED EQUIPMENT

BOILERS

2—230 H.P. Babcock & Wilcox watertube boilers; complete with grates and usual fittings. Fidelity & Casualty policy guaranteeing 150-lb. pressure; f. o. b. Indiana.

2—Murray watertube boilers, 150 H.P., 150-lb. pressure; excellent condition; f. o. b. Iowa.

CRANES

1—Caterpillar traction full revolving steam crane, equipped with 40-ft. boom and 1-yd. clamshell bucket; like new; immediate delivery; f. o. b. Ohio.

1—Full revolving traction type crane, equipped with 30-ft. boom, ¾-yd. Lakewood clamshell bucket; one man machine; excellent condition; immediate delivery; f. o. b. Chicago.

DRAGLINES

1—T-1 Monighan Walker dragline, equipped with 40-ft. boom, 1-yd. bucket, 55 H.P. Monighan kerosene or gasoline engine with self-starter, only 60 days old; Delco lighting system; condition guaranteed; immediate delivery; f. o. b. Illinois.

1—Full revolving caterpillar traction dragline, equipped with 40-ft. boom, 1-yd. Page bucket; can also be used as crane; in A-1 condition; f. o. b. Ohio.

1—Lidgewood dragline, mounted on four traction wheels; all steel machine equipped with 2-yd. bucket, 60-ft. boom; excellent condition; ready for immediate delivery.

DERRICKS

1—Stiff leg derrick, 40-ft. mast, 70-ft. boom, 15x15 timbers, complete with bull wheel and sheaves; clamshell operating; like new; for immediate delivery; f. o. b. Illinois.

MIXERS

1—½-yd. Lakewood mixer, equipped with power loader, spout and steam engine; boiler lap seam, double riveted, 36"x6'6"; on traction wheels; 95 per cent new; f. o. b. Chicago.

1—Foot Paver, No. 6-A, ⅔-yd. capacity; end discharge; reversible traction; steam steering; boiler vertical lap seam; good for 100 lbs.; excellent condition; f. o. b. Chicago.

CRUSHERS

1—Austin, No. 5 gyratory crusher; straight drive; manganese fitted; excellent condition; ready for immediate delivery; f. o. b. Ohio.

1—McCully No. 3 crusher head; made of manganese steel; brand new; f. o. b. Illinois.

SHOVELS

1—Thew O, shop No. 952, equipped with ⅝-yd. dipper, manganese lip and teeth; Ohio butt strapped, Ohio boiler; special high lift shovel, guaranteed A-1 condition; f. o. b. Michigan.

1—Full revolving caterpillar traction, ⅞-yd. steam shovel; excellent condition; immediate delivery; f. o. b. Ohio.

DUMP CARS

30—4-yd. Western 36-in. gauge, 2-way dump cars; excellent condition; thoroughly overhauled; f. o. b. Chicago.

10—6-yd. Peteler standard gauge, 2-way dump cars; thoroughly overhauled; f. o. b. Chicago.

LOCOMOTIVES

4—Davenport 36-in. gauge locomotives, thoroughly overhauled; for immediate shipment; f. o. b. Chicago.

2—American 6-wheel switchers, 180 and 160-lb. pressure respectively; thoroughly overhauled; 52 and 55 tons weight; just out of shops.

1—40-ton Baldwin 4-wheel saddle tank standard gauge locomotive, drivers 44-in. diameter, tires 2½ inches; tested 160-lb.; thoroughly overhauled; f. o. b. Illinois.

GAS LOCOMOTIVES

2, 3, 4, 6 and 8-ton locomotives, any gauge, New.

MARSH-BOTHE MACHINERY CO.

975 OLD COLONY BUILDING :: :: :: CHICAGO, ILL.

FOR SALE

CRUSHERS	PULVERIZERS	GRINDERS
1—No. 21 Gates Gyratory	12—Hammer Pulverizers	1—60x84 Jaw Crusher
2—No. 12 Gates Gyratory	15—Sets Crushing Rolls	10—10x20 to 36x48 in.
1—No. 10 Gates Gyratory	35—Griffin Mills	6—Portable Jaw Plants
1—No. 10 Kennedy Gyratory	8—Ball & Tube Mills	4—Coal Crushers
1—No. 9 Gates Gyratory	2—Symons Disc Crushers	3—Tipples
3—No. 8 Gates Gyratory	15—Kent Mills	6—Ore Washers
4—No. 7½ Assorted Gyratory	3—Pebble Mills	8—Channeling Machines
6—No. 6 Assorted Gyratory	3—Sturtevant Mills	Conveyors—Screens
3—No. 5 Assorted Gyratory	4—Burr Mills 3—Raymond Mills	Stripping and Loading
8—No. 4, 3 and 2 Assorted		Shovels, Cars and Cranes

Locomotives, Cars, Rails, Steam Shovels, Dragline Machines, Dredges, Corliss Engines, Water Tube and Return Tubular Boilers, Turbo Generators, Direct Connected and Belted, also Fuel Oil Direct Connected Sets, Heavy Fuel Oil Engines, Electric Fuel Oil Locomotives, Compressors, Drills, Cutting and Channeling Machines, Stone Derricks, Electric and Steam Hoists.

J. F. DONAHOO CO. **Birmingham, Ala.**

STONE CRUSHERS

Need one? Then get in touch with us before otherwise supplying your requirements. We are headquarters for good "used" machinery of this character and have many bargains in:

Gyratory Type: Size No. 2 to No. 21, nearly all makes.
Jaw Type: Size 7½x13" to 60x84".
Crushing Rolls: Have several sets, large and small.
Symons Disc: Sizes 18", 24", 36" and 48".
Pulverizers: Have quite a few, including a Sturtevant No. 2 Duplex Ring Roll Mill, a Williams No. 10 Deck Sweeper, a Jeffrey A-7 Heavy Duty, a Jeffrey No. 2, a Gardner No. 1, Etc.

We can serve you equally as well in Locomotive Cranes, Locomotives, Cars, Hoisting Engines, Air Compressors, Etc.

WM. B. GRIMSHAW CO. 1055 Drexel Bldg. Philadelphia, Pa.

Dealers in USED But NOT ABUSED Machinery

USED EQUIPMENT BARGAINS

Monighan Drag Line
All steel, 40-ft. boom, 1-yd. capacity, full revolving, self-propelling.

Browning Locomotive Crane
10-ton, 4-wheel, standard gauge, 35-ft. boom, D.D. for bucket.

Austin Gyratory Crusher
No. 4, rear drive, new concaves.

Porter Locomotive
36-in. gauge, 7x12, saddle tank.

All thoroughly rebuilt, in guaranteed first class condition

MOORE BROS 39 S. La Salle St. CHICAGO

FOR SALE

Stiff Leg and Guy Derricks
Two and Four-Drum Hoisting Engines
Air Compressors, Air and Steam Drills
24" and 36" Dinkey Locomotives
24" and 36" gauge Koppel Cars
24" and 36" gauge Western Dump Cars
Steam Shovels and Drag Lines

ELLIS WOOLMAN
117 27th Ave., S. E.
Minneapolis, Minn.

FOR SALE

Two large steel bins, hopper bottom. 450 ft. steel conveyor cashing for 16-in. screw conveyor, without lids.

One Special, 112 H. P., single-band, friction, electric hoist, complete. Almost new.

Address Box 21
PIT & QUARRY
538 S. Clark St. Chicago, Ill.

No. 10K. GATES

Manganese fitted, regular drive $6,000.00
Elevator, $1,400.00
Immediate Delivery
ROSS POWER EQUIPMENT CO.
Indianapolis, Ind.

Keystone Excavator (skimmer and ditcher scoops)
Byers Auto Crane, Model C ¾ clam shell
7 Bottom Dump wagons, 2 yd.
Vacuum Pump, nearly new, 12x26x18
Sturdevant Mill for pulverizing
Ingersall Seargent Compressor, 24x20
500 KW Gen'l Electric Generator
Roller, 3 wheel, 10 ton
Lock Box 205, Crown Point, Ind.

WANTED

Dragline cableway excavator, with 150 to 200 ft. range. Steam or electric drive. State full particulars as to capacity, condition, make, price and location.

York Brick & Tile Co., York, Neb.

HEADQUARTERS

for Boilers, Vertical, Tubular and Water Tube; Corliss, automatic or throttling governor engines.

The Cleveland Belting & Machinery Co.
1524 University Road
CLEVELAND OHIO

BUCYRUS SHOVEL

Railroad type, 65 ton, about 30 ft. boom, 18½ dipper stick. 2½ yd. dipper, fine condition; $6,000 quick will take it.
Also ½ yd. Bucyrus steam traction, just overhauled, $3,500. Cash or terms.

Dan'l B. Straley Crown Point, Ind.

USED MOTORS

For Immediate Delivery—Overhauled and Guaranteed — Largest Stock in America to Choose From. For Sale: 3 Phase, 60 Cycle, 220 V.

H.P.		Speed
1—	3—General Electric	1800
1—	3—Westinghouse	1200
1—	5—Wagner	1800
1—	5—Allis-Chalmers	1200
1—	7½—General Electric	1800
1—	10—Westinghouse	900
2—	15— " Type CCL	1750
2—	15—Watson, slip-ring, var. speed	1720
1—	15—Fairbanks-Morse	1200
1—	15—General Electric, Form L	1200
1—	15—General Electric	1200
3—	15—Fairbanks-Morse, slip-ring, constant speed	1200
1—	15—Westinghouse, vert.	1135
2—	15—Allis-Chalmers	1130
2—	15—Allis-Chalmers	860
2—	15—Westinghouse	850
4—	20—Westinghouse	1750
1—	20—General Electric	1200

Send for MONTHLY BARGAIN SHEET, showing complete stock and net prices.

GREGORY ELECTRIC CO. CHICAGO, ILLINOIS

SHOVELS

1—Osgood Model 18 Steam Shovel, shop No. 511.
1—No. 0 Thew, with ⅝ yd. dipper.
2—Model 28 Marions, on traction wheels.
1—No. 3 Keystone, with skimmer and trench buckets.

HOISTING ENGINES

3—Byers Hoisting engines with boom swingers.
2—American Hoist & Derrick Co. with boom swingers.

DERRICKS

5—Stiff Leg Derricks, 60 ft. boom.

AIR COMPRESSORS

1—Worthington - Laidlow - Dunn - Gordon Air Compressor, steam driven, 690 ft. 110-lb. pressure.
1—Worthington - Laidlow - Dunn - Gordon Air Compressor, steam driven, 450 ft., high pressure.
1—Ingersoll Sargent, No. 9462, size 10x12.
1—Ingersoll Sargent, shop No. 12225, steam driven.

Write us your needs in Rock Crushers or Railway Supplies.

MIDWESTERN CO.

Telephone Majestic 8356

140 So. Dearborn St. Chicago

FOR IMMEDIATE DELIVERY

A. C. and D. C. MOTORS & GENERATORS—New and Used

2—75-HP 500-v DC Westinghouse motors 3—50-HP 500-v DC Westinghouse motors
2—80-HP 500-v DC Allis-Chalmers motors 1—30-HP 500-v DC Westinghouse motor

We Are Direct Agents for GENERAL ELECTRIC NEW MOTORS AND GENERATORS of All Descriptions

ALL MACHINERY SOLD BY US IS GUARANTEED

Send us a list of your needs and we will convince you.

CHICAGO ELECTRIC CONSTRUCTION CO.

740 W. VAN BUREN ST. CHICAGO, U. S. A.

FOR SALE

1—No. 1 Thew, full revolving steam shovel, one yard dipper on R. R. wheels.

1—18 x 24 Blake Type Jaw Crusher.

1—1-yard Orange Peel Bucket.

All in excellent condition and ready for immediate shipment.

National Surface Guard Co.
Fisher Bldg. Chicago, Ill.

FOR SALE

20—Crushers, Nos. 2 to 10, mostly Gates
2—327 HP W. T. boilers, 180 lbs. $9.50 HP.
9—150 HP. 125-lb. H. R. T. boilers, butt strap
1—No. 10K Gates Manganese fitted crusher
1—No. 4 crushing plant, motor drive
1—No. 3 crushing plant, engine drive
2—48"x12' Taylor Manganese screens
25—Air compressors, 60 to 4,000 cu. ft.
50—Steam engines, 30 to 1,500 HP.
1—95 HP. Loco. type boiler.
75—Steam and Centrifugal Pumps
1—30-60 HP. Emerson-Brantingham tractor
1 yd. Concrete Mixer (side load)

Send us your inquiries for electrical equipment, engines, hoists.

Ross Power Equipment Company
Indianapolis, Ind.

CRANES

Byers Auto Crane, Model "B"
15-ton, 8 wheel Browning
10-ton Brown-Hoist
10-ton Industrial
5-ton Industrial

Locomotives, 36" Gauge
4 Porters, 9x14 Saddle Tank
4 Porters, 11x16 Saddle Tank
2 Vulcans, 10x16 Saddle Tank
2 4-ton Bell Oil, 24" Gauge.

Locomotives, Standard Gauge
50-ton Saddle Tank
40-ton Saddle Tank
35-ton Saddle Tank
60-ton Mogul
58-ton 10-wheel
56-ton 10-wheel

Buckets
1—1-yd. Hayward Clamshell
1—1-yd. Browning Clamshell
1—2-yd. Brown Hoist Clamshell

Steam Shovels
1—No. 28 Marion ¾-yd.—Shop No. 3706
1—No. 1 Thew, 1-yd.—Shop No. 307.
1—70-ton Bucyrus 2½-yd.—Shop No. 135
1—95-ton Bucyrus 5-yd.—Shop No. 217

Hoists
National D. D. Electric motor, 220 volts, 3 phase, 60 cycles, with swinger

10x12 Flory D. C. D. D. Skeleton
12x14 Flory D. C. D. D. Skeleton
8¼x10 Kendell D. C. D. D. boiler

Crushers
5—No. 5 Gates Style D Gyratory
1—No. 5 Gates Style K Gyratory
1—No. 8 Gates Style L Gyratory

Allis-Chalmers Jaw, 24x60

Derricks, 10 to 30-ton; 80 flat cars, standard gauge; logging cars; cane cars. We carry a complete line of Contractors' Equipment—rebuilt, for immediate delivery.

Hoisting Machinery Company — **50 Church Street, New York City**

FOR SALE

LOCOMOTIVE CRANES

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1—10-ton, 3-wheel, Kelly-Springfield, steam.
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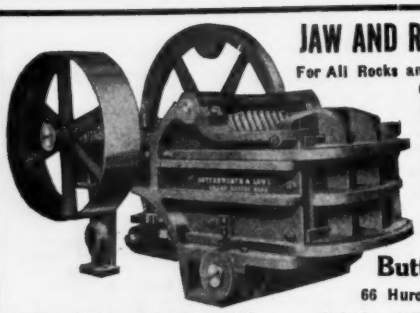

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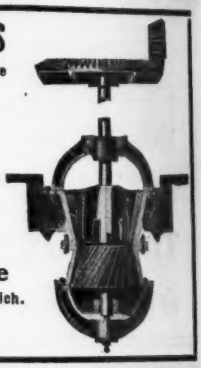

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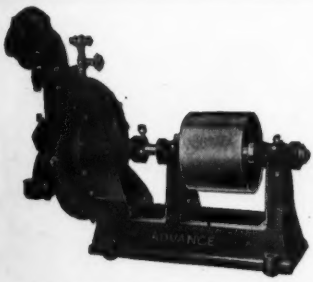

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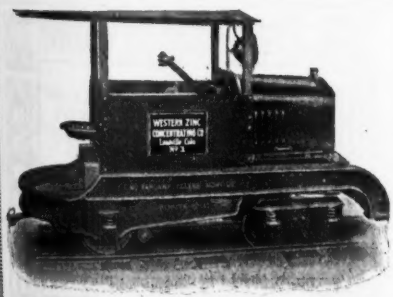

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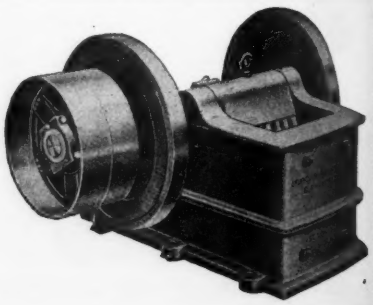

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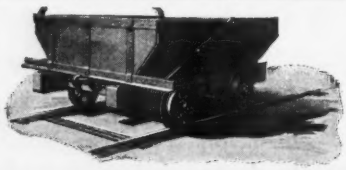

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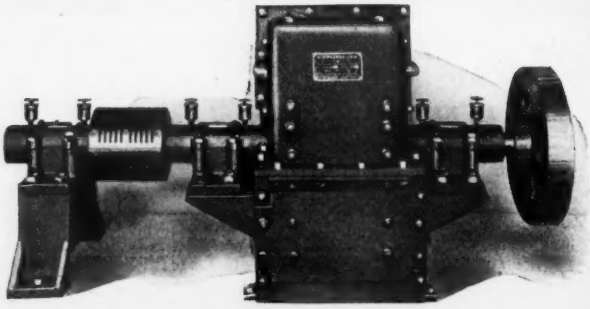

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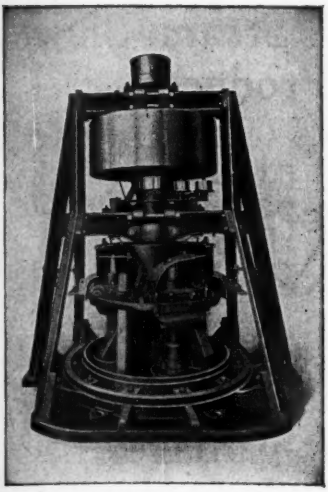

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Produces a very fine, uniformly-ground product at minimum cost. A mill built to meet the demands of the most exacting trade.

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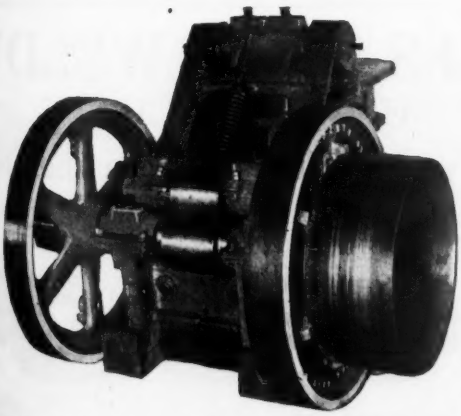

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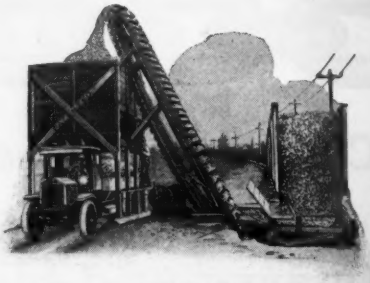

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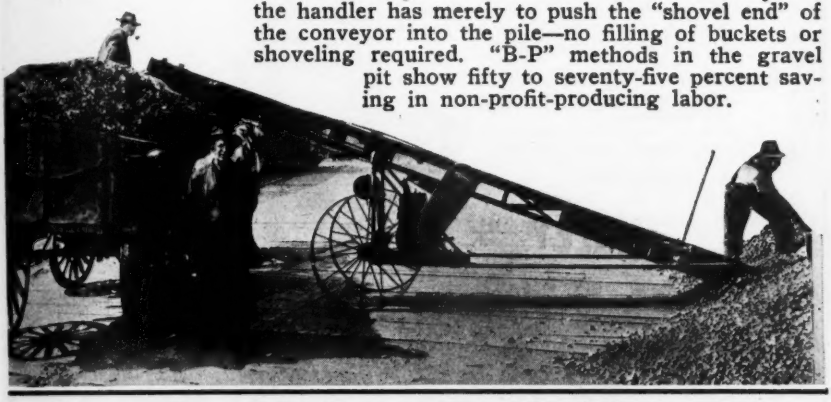

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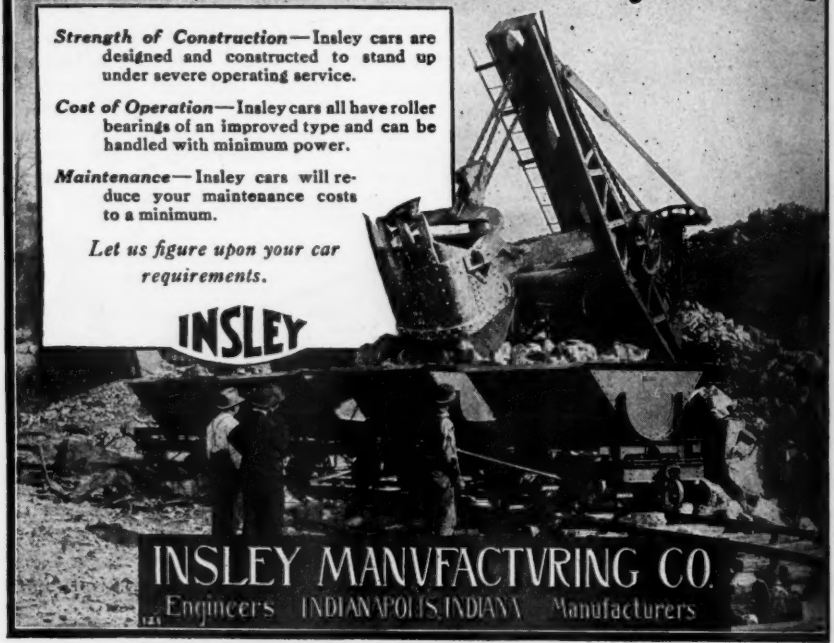

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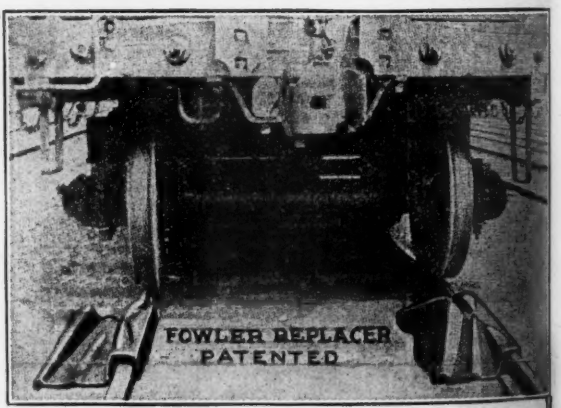
when a derailment occurs and things are tied up.



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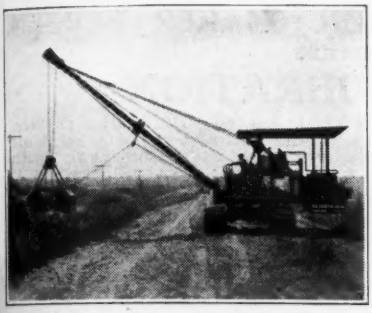

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Five Machines in One

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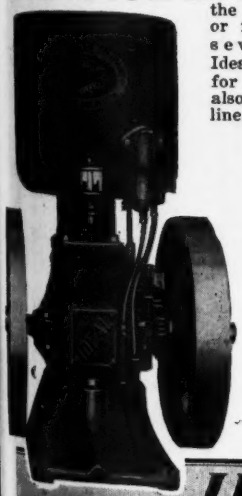

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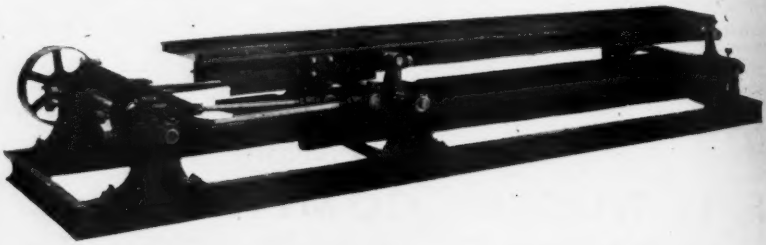

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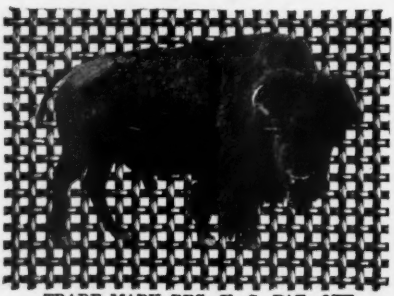

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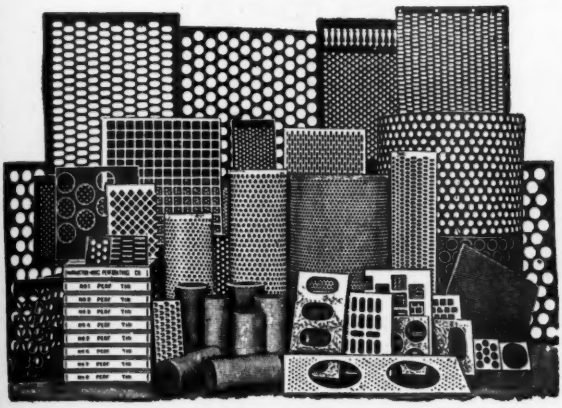

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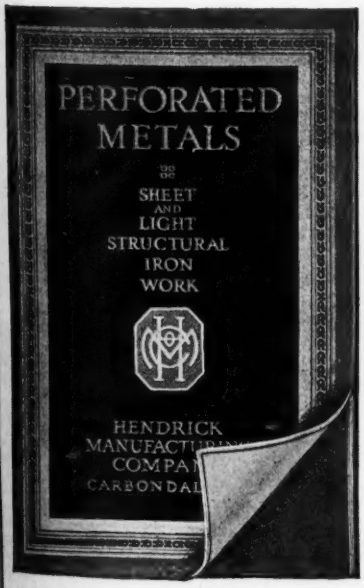

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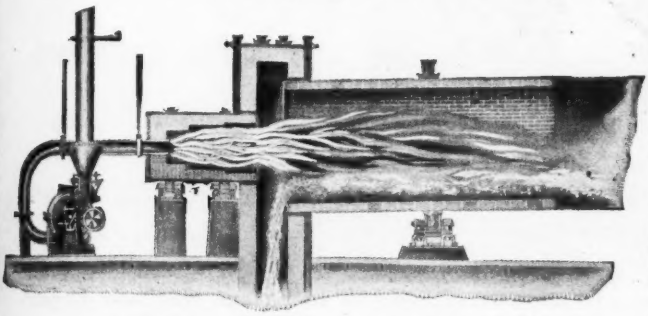

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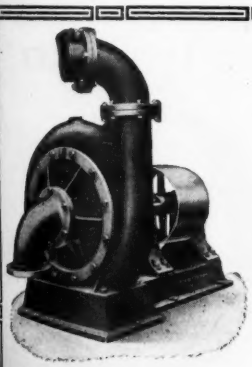

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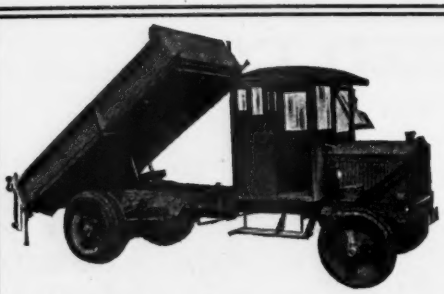

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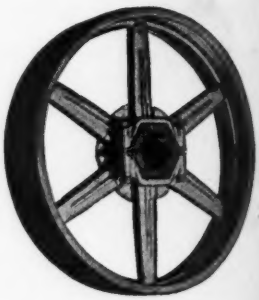

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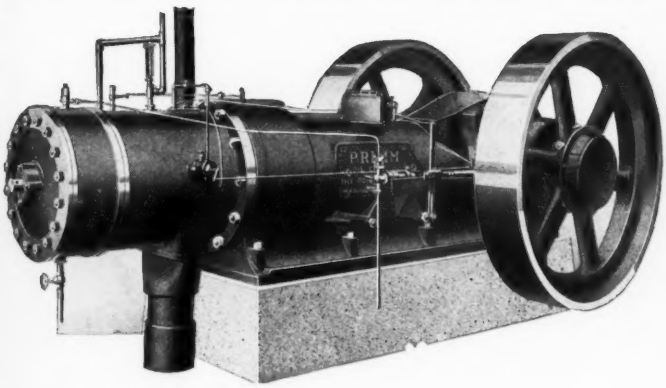

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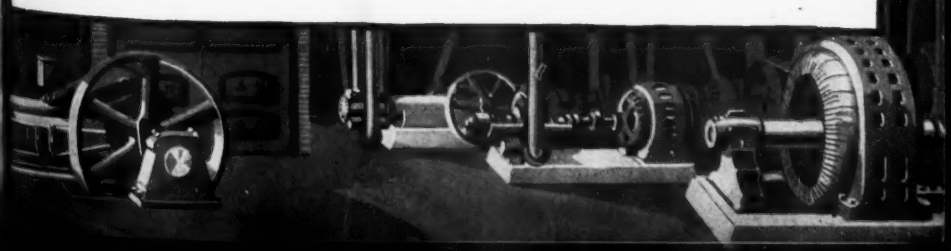

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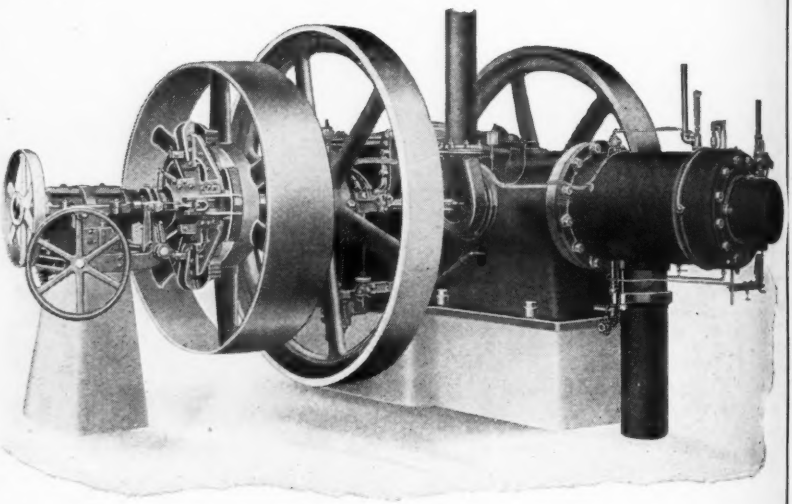

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How to Increase Boiler Room Efficiency

From a paper before the American Boiler Manufacturers' Association at Buffalo.

By D. S. JACOBUS,
Advisory Engineer, Babcock & Wilcox Company.

More is often to be lost or gained in the operation of the boiler room than in any other part of a power plant. To secure efficiency and capacity we all know that the following features must be watched after: The surfaces of the boiler must be clean inside and out and the gas passages and flues must be free and unrestricted from the deposit of soot or ashes; the baffles and settings must be reasonably free from leakage; the fuel must be properly fired.

To secure the best efficiency, the fuel or any combustible elements distilled from the fuel must be completely burned within the furnace chamber. Again, the combustion must be such that the gases that pass from the furnace are uniform in composition; that is, some of the gases must not contain a considerable amount of excess air and others possibly a deficiency of air, thus leading to what is termed a laneing action.

If the gases are burned entirely within the furnace chamber, the entire surface of the boiler is effective in absorbing heat. If there is secondary combustion between the boiler tubes, which may occur to a considerable extent if there is a laneing action in the gases and may possibly extend entirely through the setting, all of the boiler surface is not effective after combustion is complete, with the result that there is an increase in the temperature of the flue gases over what it would be should the gases be burned within the furnace, and a corresponding loss of efficiency. Again, in some instances there is a loss through combustible elements, such as carbon monoxide, passing off in the flue gases. Another loss that is experienced in coal burning is through the unconsumed fuel in the ashes, often due to poor operation.

* * *

Test Results and Operating Results.—It is a mistake not to provide proper instruments to guide the firemen. A general impression prevails that test results are one thing and operating results another, and that the operating results necessarily fall considerably below the test results. Operating results do as a rule fall considerably below the test results, but there is no reason why this should be so in the great majority of cases.

It is often assumed that the average flue-gas analysis combined with the percentage of carbon in the ash is a measure of the efficiency of a furnace, and that if these features are known the boiler man should be able to guarantee the boiler efficiency. Such is not the case, as a great deal depends on whether all of the combustion is or is not completed within the furnace chamber. If there is delayed combustion between the tubes of the boiler, it will have an influence on the flue-gas temperature and efficiency, and it can readily be appreciated that if two plants are operating with the same average flue-gas analysis and percentage of carbon in the ash, and in one of the plants there is secondary combustion between the tubes and in the other there is not, the plant where all of the combustion is completed in the furnace will have the highest efficiency.

* * *

Percentage of Carbon Dioxide as Indication of Boiler Efficiency.—Often great stress is laid on carrying a high percentage of CO_2 irrespective of the other operating conditions, and in certain instances the firemen are paid bonuses based on the percentage of CO_2. If all the other conditions of operation are watched after, this system will give good results; but if the carrying of a high percentage of CO_2 is made the sole aim of the firemen, there may be wastes in other directions that will counterbalance any gain through minimizing the amount of excess air.

Where a high percentage of CO_2 is carried, it is often found that CO will be present. In some installations it is impossible to carry more than a certain percentage, say 13 per cent, of CO_2 before having a material amount of CO. An analysis with coal firing which indicates 13 per cent of CO_2 and no CO is more favorable

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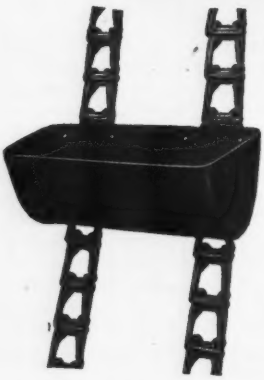

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from a heat-loss standpoint than one that gives 15 per cent of CO_2 and ½ per cent of CO. As the carrying of a high percentage of CO_2 is apt to lead to secondary combustion between the boiler tubes, thereby involving an additional loss through increasing the temperature of the flue-gases, it can readily be seen that it is often a mistake to aim for too high a percentage of CO_2. How high a percentage should be aimed for depends upon the form of furnace and the furnace volume. Ordinarily, with coal it does not pay to exceed about 13½ per cent.

The Hempel type apparatus, where the gases are shaken up with the solutions, is, as a rule, more reliable in indicating the amount of CO than the Orsat, and in accurate work it is well to check the Orsat apparatus against the Hempel.

* * *

Loss of Efficiency Due to Impure Feed Water.—The use of impure feed water is entirely too prevalent. This naturally leads to a loss in efficiency through incrusting the inner part of the heating surface and through making it necessary to blow down the boilers an undue amount. There is an added loss through having to cut out the boilers a large part of the time for cleaning and for replacing leaky tubes. Greater attention is now being given to securing clean feed water, especially in the larger plants. In many instances it pays to install evaporating apparatus for supplying the makeup water. Naturally, this can be done only where surface condensers are used, but where it can be done good results are bound to follow.

A considerable loss in plant efficiency in coal firing often comes through the carrying of banked fires. There is a corresponding loss in burning other fuels, and the operation of a given plant may cause this element to greatly affect the results secured. In an instance, in one particular case where I was active in securing the best results, the economy of an oil-burning plant was raised over 25 per cent simply through operation and by going over the plant to eliminate heat losses through drips, etc.

* * *

Securing Efficiency in Oil-Burning Plants.—In oil-burning plants a mistake is often made in keeping the steam pressure as steady as possible by changing the firing conditions one way and the other to such an extent that it is impossible to maintain the best furnace efficiency. The best results are secured by feeding the oil to the burners at a reasonably uniform rate, varying the oil pressure one way and the other slowly to meet the demands of the power, even though this may result in a less steady steam line than would be secured through jumping the oil pressure one way and the other to maintain a practically constant steam pressure. A recording pressure gage placed on the oil line where the steam pressure is maintained at a constant figure will often give illuminating results in indicating a broad band with the oil pressure varying 200 or 300 per cent one way and the other, whereas for best operation the oil pressure will be represented by a reasonably steady line which will follow in a general way the power requirements. A good guide for efficient operation in running with oil fuel is the amount of superheat obtained, which should be about uniform in all the boilers. If the superheat in a boiler becomes high, it is due either to running the boiler harder than the others or to excess air, either of which conditions should be corrected to obtain the best results.

Another good guide in oil burning is to observe the appearance of the gases as they pass through the setting. If the gases are clear, it indicates excess air, and if too smoky, an insufficient air supply. For the best results there should be a slight haze throughout the gases. The appearance of the gases leaving the stack is also a good guide, as too clear a stack indicates excess air, whereas a smoking stack shows insufficient air in one or more of the boilers, the best conditions being indicated by a slight haze.

* * *

Bonuses for Operating Crews.—It is feasible to set a figure for efficiency higher than that which would ordinarily be secured and to pay the operating crew a certain bonus based on the increase efficiency above this figure. In this connection, Edward N. Trump has said the following:

"If you give a bonus to the firemen, you will be sure to have some improvement in efficiency. I have found at least 10 per cent saving by paying bonuses to the firemen, sometimes by

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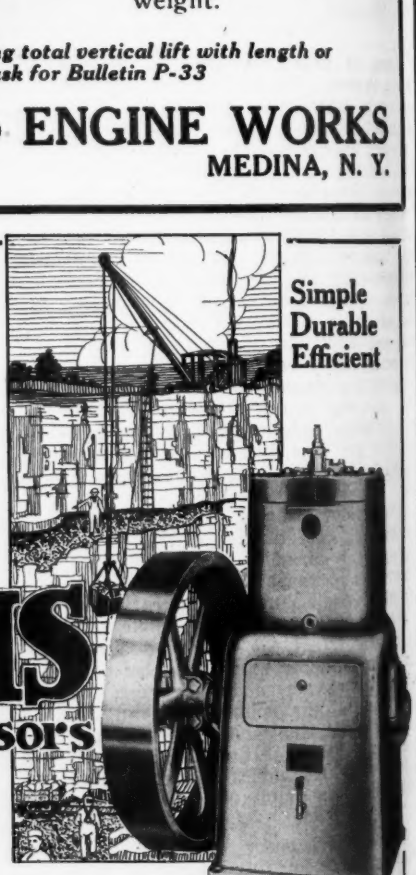

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working one shift against the other. Competition encourages them to work harder, to increase the saving."

Mr. Trump has secured record efficiencies in the plants of his company. With boilers of about 300 HP., fitted with economizers, run at from 100 to 120 per cent of rating, he has secured plant sufficiencies, measured by the monthly operation, of 85 per cent. In his boiler plants with very large units he has obtained a corresponding efficiency of 88 per cent. The load on the boilers in Mr. Trump's plants is nearly uniform and does not vary to the extent that it does in the average electrical-power generating station.

For a long time there were many instances where the use of the older type of waste-heat boilers would not lead to a good return on the investment. Since developing our modern type where the boilers have a considerably higher draft resistance than in the older type and where this draft resistance is overcome through the use of an induced-draft fan, we have installed over 100,000 HP. of such boilers in connection with open-hearth furnaces alone, and the steam generated by these boilers represents a saving in the neighborhood of 1,000,000 tons of coal per year. This is only one of the fields where waste-heat boilers may be applied to advantage, and it shows the magnitude of the savings that can be effected.

* * *

Design of Furnace and Stoker.—Furnace design cannot be divorced from stoker design when the best obtainable results are aimed for. After designing the stoker, the next feature bearing on economy is the disposition of the surface of the boiler. With a given boiler arrangement, tube spacing, etc., it usually follows that to secure a high heat transfer the draft resistance will be greater than with the same amount of surface arranged and provided with baffles that will give a lower rate of heat transfer. If the arrangement of heating surface and baffles is such as to lead to too high a draft resistance, the capacity developed by the boiler with a given draft may be lower than desired. If the arrangement is such as to give a low draft resistance, the efficiency may be less than it should be. In providing a proper design, one of these features must be balanced against the other and an arrangement provided which will give the best all-around results.

The addition of an economizer will increase the economy, say, 5 to 10 per cent. Now that the price of fuel is increasing everywhere, a greater number of economizers are being installed.

For large plants the efficiency obtainable with a modern steam-boiler and steam-turbine installation is greater than could be secured through gasifying the coal in producers and using the gas in gas engines. A large steam-turbine plant of the best modern design will generate a kilowatt-hour with a heat consumption based on the heat in the fuel of 17,000 b.t.u. per kw-hr. This as a round figure for plants of the best modern construction with a load factor of, say, 60 per cent and steam pressures of from 250 to 300 lbs.

By increasing the steam pressure and raising the super-heat, the figure can no doubt be reduced to the neighborhood of 15,000 b.t.u. per kilowatt-hour. There is no likelihood of the gas engine displacing the steam turbine for large power generating station work for some time to come.

What has been said about a smooth bottom for the coal car is even truer of the firing floor, in case the coal must be fired from the floor. The floor in front of the boilers should be level and smooth. Hence a well-made concrete floor is desirable, because it helps easy and quick shoveling of the coal and can be kept clean easier than a brick or a dirt floor. Many a boiler room, even in a plant of considerable size, is defective in this respect. The engine room is apt to have a smooth hardwood or a special tile floor kept painfully clean by frequent scrubbing, but for the boiler room any kind of a floor, such as broken concrete, brick pavement with missing brick, or even beaten earth, is considered good enough. A good fireman will not stay in such a plant, and if he does stay he soon becomes indifferent. If the owner or the manager of the plant takes no pride in the appearance of the boiler room and its economical operation, why should the fireman? Therefore, if the owner wishes to keep good fireman and have the coal he buys burned with the highest efficiency he should provide ample space for firing, a level and smooth firing floor, and encourage neatness in the boiler room.

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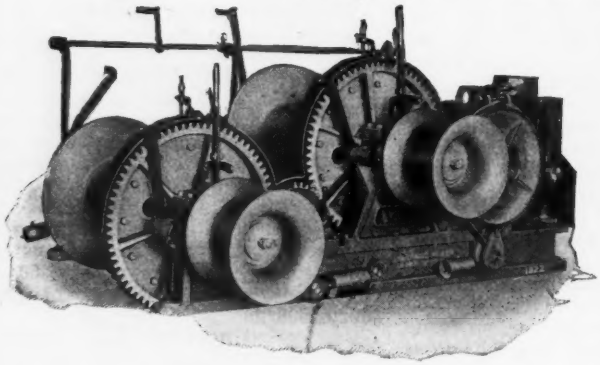

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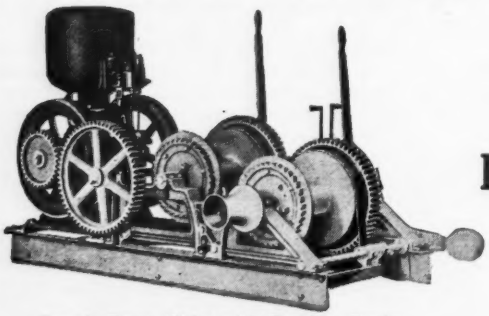

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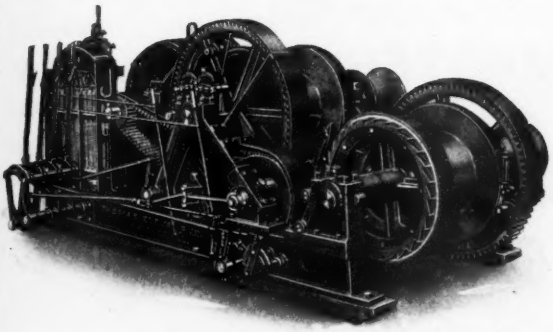

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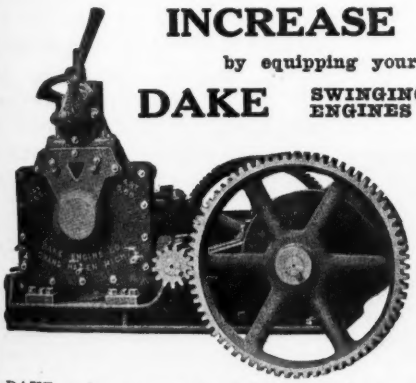

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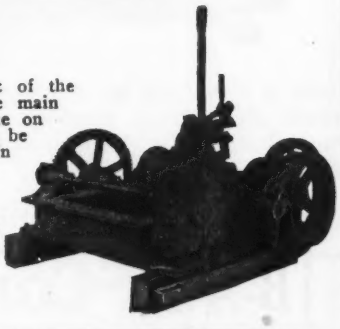

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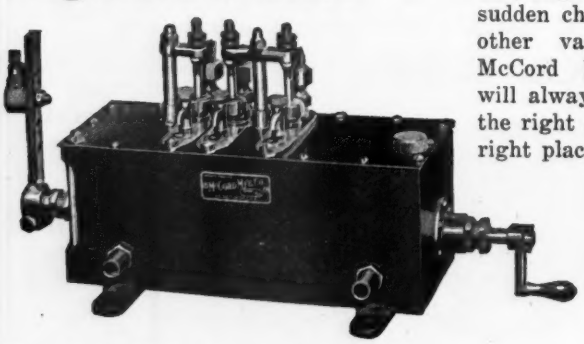


and, regardless of even the most sudden changes of temperature or other varying conditions, your McCord Force Feed Lubricator will always thereafter deliver just the right amount of oil to just the right place, at just the right time.

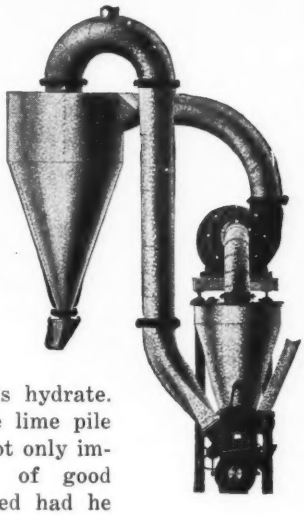
Type B-A McCord Lubricators, pictured here, are especially designed for severe outdoor service. They stand up under that service.

There is a McCord for every need, however—and a need for every McCord. Install McCords at once—in your Quarry, Pit or Power Plant—on your Pumps, Shovels or Dredges—Steam, Gas or Oil Engines and Compressors. Write for information.

McCord Mfg. Co., Inc., Detroit, Mich., U. S. A.

TYPE B-A McCord FORCE FEED Lubricators

A remark made by one of our customers manufacturing Hydrated Lime emphasizes more clearly than anything we can say, the economy in using Raymond Air-Separating equipment instead of screens.



"Our neighbor uses screens for his hydrate. Outside his plant there is a waste lime pile of many hundred tons containing not only impurities but a high percentage of good Hydrate which he could have saved had he the same equipment as ours."

The Raymond Air-Separating System performs three distinct operations and gives a finished product which does not blister in wall plaster.

The Hydrate is fed to the System by an automatic feed arrangement, which feeds a constant amount, and prevents flooding.

The beaters in the grinding chamber of the mill are operated at a low speed to merely knock the good Hydrate free of the impurities like core, sand and unburnt lime. These impurities being discharged through an automatic throw-out attachment.

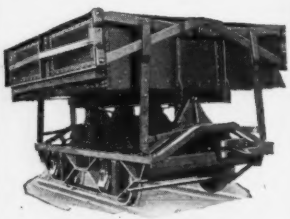
The good Hydrate is carried up into the air-separator, where large particles which are not fine enough are returned for further reduction and the finished uniform material is carried direct to a storage bin, from which it is bagged.

An investigation will bear out all these statements and show you where a great saving can be obtained.

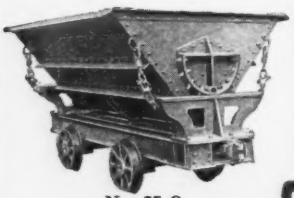
Raymond Bros. Impact Pulverizer Co.

1307 Branch St. Chicago, Ill.

Tell Us About Your Plant—



No. 145-Q



No. 77-Q

And we will tell you about a car that will haul your sand, gravel or stone at a lower figure than you perhaps ever thought possible.

With the impending enormous demand for sand, gravel and crushed stone the subject of rapid and highly efficient handling of material merits immediate attention from those desirous of doing their share.

With the ample facilities at our command—we have one of the largest car building plants of the kind in the world—we can meet your need with sturdy, dependable, long-lasting haulage cars, specially adapted to your class of work.

A line from you will receive our prompt attention.

The Watt Mining Car Wheel Co.

Barnesville, Ohio

Denver:
Lindrooth, Shubart & Co.
Boston Bldg.

San Francisco:
N. D. Phelps
Sheldon Bldg.

Philadelphia:
Edelen & Co.
235 Commercial Trust Bldg.

Watt Cars